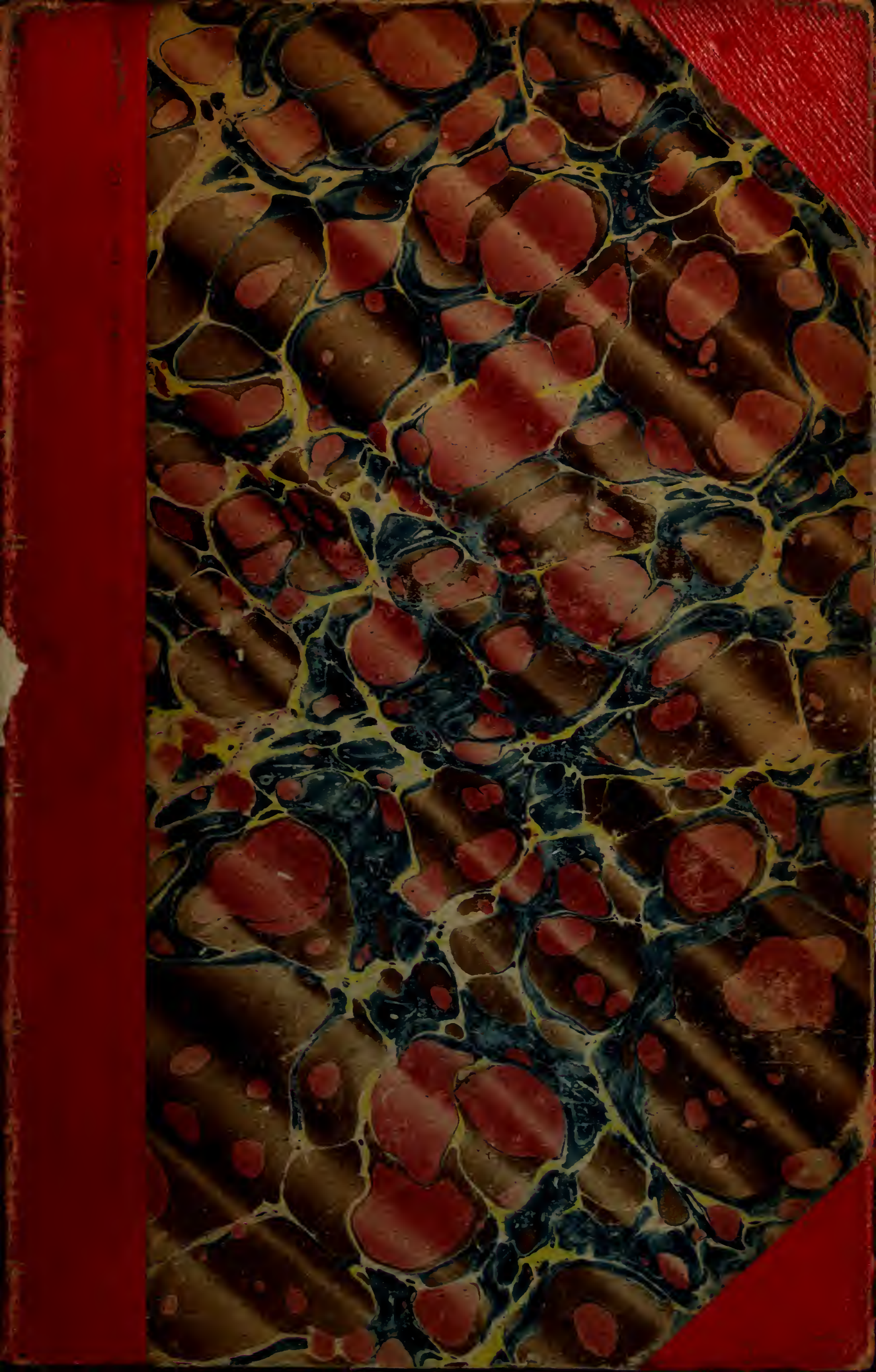




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THE ODONTOGRAPHIC JOURNAL.

VOLUME IV.—*April*, 1883.—I.

THE PHYSIOLOGY OF PROTOPLASMIC MOTION.

BY TH. W. ENGELMANN, M. D., OF UTRECHT.

Translated by Chas. S. Dolley, M. D., Rochester, N. Y.
(*Concluded.*)

V. BEHAVIOR OF PROTOPLASM TOWARDS ARTIFICIAL IRRITANTS.

Protoplasmic contraction may be especially influenced—similarly to the movements of muscles and other excitable formations, and outside of the normal physiological irritants,—or may be produced, through many forms of external encroachments, the so called *Artificial Irritants*. These irritants are essentially the same as for other excitable formations. In general every disturbance of the molecular equilibrium acts as an irritant if it takes place with a certain degree of rapidity and reaches above a certain amount. But above all come electric shocks, changes of temperature, and mechanical and chemical trespasses. The amount or degree of irritability is measured by the weakest yet still potent irritant, and varies according to the form of the protoplasm, the irritation, and other existing conditions. The protoplasm of fresh water *amoebae*, *diatoms* and cells of *valisneria* re-act better after a very weak induction current than does the white blood corpuscle. (83).

79. KUHN (at place mentioned, p. 47.)

80. *Ibid*, p. 65.

81. *Ibid*, p. 86.

82. C. BINZ, ueber die Einwirkung des Chinin auf Protoplasmabewegung. Arch. f. Microscop. Anat. III., p. 383. 1867.

83. Private observations.

The protoplasm of *Pelomyxa* which is moreover not very sensitive, is greatly excited by sudden illumination, which is without any irritating influence on other forms of protoplasm. (84).

The general conditions in regard to artificial irritants with which the vigor of the movements increases and subsides, are the same as of spontaneous excitability. Yet the limit appears somewhat broader; as has before been remarked, artificial irritants may still be potent after spontaneous movements have ceased, (e. g. by chilling or warming, the withdrawal of O, or the accession of CO₂). (85).

In outward appearances the results of artificial irritation may be of the greatest diversity. Here must be taken into consideration the fact as to the protoplasm being prompt in movement or not, and in the first place the kind and energy of the spontaneous movement at the time of the irritation, further in respect to being unequally irritated in different places whether the protoplasm is in all cases synchronous and equipollent, or only local; still further whether it is freely movable or enclosed in a firm envelope, etc.

The individual observations noticed further on, give some idea of the diversity of appearances.

Usually the result of artificial irritation expresses itself, in that the protoplasmic parts directly reached by the irritant; transiently and without marked change in volume, draw themselves together, exhibiting the smallest possible surface in a manner similar to an irritated muscle, and strive to assume a spherical form. The rapidity and power accompanying this come mostly within the same boundaries, which are of value for the spontaneous movements of the same object.

I. ELECTRICAL IRRITATION.

Electric currents only excite the protoplasm when they flow directly through the same, never from a distance. (86). In the first place separate, sudden interruptions of the current are followed by excitation, yet as in the muscle, the interruption has little to do with it; the beginning of the current is much more the special cause of irritation. The excitement does not appear in general after closing the

84. TH. W. ENGELMANN, Ueber Reizung kontraktillen Protoplasmas durch plotzliche Beleuchtung. Arch. f. d. ges. Physiol XIX p. 1.

85. Compare among others, KUNSE, Unters. uber das Protoplasmas, etc. p. 45 and 53. (*Amoeba*), p. 106 (*Tradescantia*).

86. BACQUEREL, (Compt. rend. 1837, II, p. 786). found strong galvanic currents (10 to 30 elements) without effect. If conducted through a spiral wire wound about some *Chara*, as though the spiral made an angle with the direction of the current.

constant current, except in those cases: where the current, after reaching its full strength continues to flow for some time. (87). The time which an amoeba can bear this is a little over a second. KUHNE (88) saw in *Actinosphaerium* the influence continue, even on the side of the animal turned towards the positive pole, so long as the current remained closed; but as a rule while the current flows with constant force the original condition soon returns as BECQUEREL (89) found in *Chara*. The closing of a constant current is a specifically stronger irritant than the breaking of the same. Irritation by breaking the current requires the current to be stronger and of longer duration. Even where there is great sensitiveness of the object to the irritation of the closing current, the opening of a strong current is quite powerless. (90). The results increase very noticeably within certain boundaries with the abruptness and range of the interruptions. Induction shocks are therefore on the average more powerful than those derived from the closing of the constant current. The influence of momentary irritations quickly following one another may amount to considerable; thus certain inefficient irritants may be augmented. If the summation of these momentary irritations influences the movements, the pauses between the irritations may be allowed to be quite long (e. g., in many *Amoebæ* and plant cells up to the fourth of a second or more), and as it appears, longer, the more indolent the spontaneous movements of the object. (91). After long continued irritation weariness appears. After strong irritation (with the same irritants), a certain period of rest is required in order to attain the same results. Very strong irritation may kill the protoplasm, when sudden turbidity with shrinking and flattening will appear, or other effects may be produced distorting the appearance of physiological processes.

BEHAVIOR OF DIFFERENT TYPES OF PROTOPLASM TOWARD ELECTRICAL IRRITATION. According to GOLUBEV (92) the influence of a single induction shock upon the living amœboid corpuscle of a frog is thus shown.—After some time (mostly $\frac{1}{4}$ to 1 minute), the until then pointed processes become blunted, and are gradually drawn within the cell body. “If the influences are stronger, the sudden and almost

87. TH. W. ENGELMANN, Beiträge zur allgem. Muskel- und Nervenphysiologie. Arch. f. d. ges. Physiol., III, p. 311 and 312, 1870.

88. KUHNE, Unters. über das Protoplasma, etc. p. 59.

89. BECQUEREL, Compt. rend., 1837, II. p. 787.

90. Arch. f. d. ges. Physiol., III. p. 311, 1870.

91. Private observations.

92. A. GOLUBEV, on the appearances which the electric shock produces upon the so-called colorless elements of the blood. Sitzsber., d. Wiener Acad., LVII. p. 557, 1868.

complete contraction of the cell to a spherical mass is observed. The cell remains in this condition for a long time and then begins again its ordinary movements." From still stronger irritation they become likewise rapidly spherical, after some minutes a mass in the form of a little drop appears, this increases for a time by the flowing in of the body substance, but again diminishes as at one or more places new drops appear, thus very rapid and striking changes of form take place, later the changes become less frequent, and the drops are withdrawn, the usual irregular pointed processes being again formed. The fresh water *Amoeba* reacts in a similar but much quicker manner. (93).

It is worthy of note that a latent stage which in consequence of but slight irritation amounts only to a few seconds, or which may become shortened by an imperceptible stronger irritation, is followed by delay, and relative stagnation of the streaming and of topical movement.

First. Appearing simultaneously with the stronger irritation we notice a withdrawal of the processes, thickening and shortening, which within a few seconds may lead to the taking on of a spherical form. Soon thereafter, usually by fits and starts, hyaline protrusions appearing like portions of the sphere originate, into which the granules immediately stream until they are often pushed to the surface. One of these processes increases more and more, stretching itself lengthwise, and finally taking to itself the entire mass of protoplasm. Ten seconds after the irritation the *amœba* may resume its former appearance and movements. The behavior of *Myxomycetes* is essentially similar to this, yet the appearances are confusing since the size of the object allows of only a partial irritation. (94).

Rhizopods (*Miliola*, *Actinosphaerium*) withdraw their pseudopodia upon electrical irritation, and frequently become varicose. (95). Those pseudopodia lying at right angles to the direction of the current require stronger irritation than those which run parallel. The protoplasmic threads of (96) plant cells having circulation (*Tradescantia*

93. TH. W. ENGELMANN, Beitr. sur. Physiol. Protoplasma, Arch. f. d. ges. Physiol., II, p. 312, 1869.

94. Recently by KUNSE, Unters. ub. d. Protoplasma, etc. p. 75.

95. M. SCHULTZE, Das Protoplasma, etc. p. 35; KUNSE Unters, etc., p. 56.

96. M. SCHULZE. Das Protoplasma, etc., p. 43; HEIDENHAIN, Notizen uber die Bewegungsercheinungen, welche das Protoplasma in der Pflanzenzellen zeigt. Stud. d. Physiol. Instit. zu Breslau. 2 Heft. p. 66. 1863.

being the type), behave in an entirely similar manner. With a weaker irritation one frequently observes in the amoeboid form of protoplasmic movements, at first only a tardiness and stagnation of the movements, then the formation of varicosities, lumps, etc. Especially instructive are the appearances due to partial irritation, KUHNE (97) saw Fig. 3 in *Tradescantia*, the stronger threads in one part of the cell draw themselves together into lumps and spheres in which after some rest a movement of the granules begin, "which one might have taken for molecular movement had it not appeared as if the granules followed each other through the ruptured and retracted basis substance, simultaneously the lumps and spheres flattened out, and still capable of being recognized as such, were driven into the neighboring streams, adjusting themselves perfectly to the remainder. The finer fibres torn as a rule in the formation of spheres, are after a time withdrawn into the thicker threads towards one or other side. The rotating protoplasm of the cells of *Chara*, *Valisneria*, etc., if simultaneously excited at all points, shows delay in regard to stagnation of the streaming. (98). Thus often the streaming protoplasm is heaped up by sufficiently strong irritation,—as appears in general very common in plant cells with moveable protoplasm,—on the short transverse wall, and the entire mass is drawn to a smaller surface without noticable change in volume, which corresponds to the formation of spheres by naked protoplasm upon irritation.

BRUCKE (99) saw produced in the stinging hairs of *Urtica*, following a short powerful irritation, protoplasmic threads, sharp pointed and furnished with swellings, also club shaped elevations of the wall layer, which were afterwards withdrawn.

97. KUHNE, Unters. über das Protoplasma, etc., p. 99 (*Tradescantia*); W. VELTEN, Einwirkung stromender Elektrizität auf die Bewegung des Protoplasma, etc. Sitzsber. d. Wiener Mathem.-Naturw. Cl. LXXIII. p. 351. 1876. The appearance of welling up described by Velten has not been noticed by other observers, neither have I seen it. I must dispute that this occurs in the peculiar manner described, by the employment at least of not over the maximum irritation.

98. BECQUEREL, Compt. rend. II. p. 151. 1837; JURGENSEN, Stud. d. Physiol. Instit. zu Breslau. I. Heft. p. 99. 1861; VELTEN, Sitzsber. d. Wiener Mathem.-Physiol. Cl. LXXIII. p. 350. 1876.

99. E. BRUCKE, Das Verhalten der seq. Protoplasmaströme in der Brendhaaren von *Urtica urens*. Sitzsber. d. Wiener Acad. XLVI. p. 2. 1863; M. SCHULTZE, Das Protoplasma, etc., p. 45.

2. THERMAL IRRITATION.

Positive as well as negative fluctuations of temperature may produce impressions the same or similar to those produced by electrical irritation, throughout the entire temperature province of manifest contractility. Here also the impression is more violent and continuous the quicker and more extensive the fluctuations. Negative fluctuations appear (whether always?) of specifically stronger influence than positive. If the temperature remains constant the same set of movements take place as are produced by slowly warming or slowly cooling. DUTROCHET (100) saw in *Chara* a rotation of medium rapidity in water of 7° come to a perfect stagnation in from four to five minutes after being dipped in water of 32° . After one hour's continuance in water of 32° the rotation was resumed and was in rapid activity two hours afterward. After being replaced in water of 7° the movements were destroyed within four minutes, but again slowly commenced after standing for half an hour at the same temperature. Also after somewhat slower warming from 18 to 27° , from 27 to 34° , from 34 to 40° , the rotation stopped for from a few minutes to an hour. Transient stagnation of rotation was observed by HOFMEISTER within five minutes after he had removed a *Nitella* from a room, the temperature of which was 18.5° C. to one cooled to $+5$ C. He also found (102) that the protoplasm in the hairs of *Ecbalium agreste* which streamed vigorously in a temperature of 16 to 17° C. became motionless after remaining from six to eight minutes in a chamber at 40° , the protoplasmic nets being very much simplified. It was only from a half to two hours continuance in the same temperature that the streaming again commenced and reached in a few minutes the vigor befitting the high temperature. The protoplasm of the same object became motionless by a rapid cooling from 40° to 16° C. "On many of its threads protuberances had been formed, after seven minutes the movements were resumed, and after eighteen were again normal, (103) (having been constantly at 16° C.) SCHULTZE (104) observed by rapid warming of the stinging hairs of *Urtica* to 40° and over, the same noticable changes of the protoplasm take place, just as BRUCKE produced by a strong shock of magneto-electromotor (see above). KUHNE and HOFMEISTER's observations upon the effect of rapid cooling upon the cells of *Tradescantia* have already been spoken of.

100. DUTROCHET, Compt. rend. III, p. 777. 1837.

101. W. HOFMEISTER, Die Lehre von der Pflanzenzelle, p. 53; compare also HUGO DE VRIES in Flora, 1873. (*Hydrocharis morsus ranae*.)

102. Ibid. p. 55.

103. Ibid. p. 54.

104. M. SCHULTZE, Das Protoplasma, etc., p. 48.

3. IRRITATION FROM LIGHT.

Most forms of contractile protoplasm seem to be insensible to light or to variations of light. For example the protoplasm of the colorless blood corpuscle and other amœboid cells of vertebrates and invertebrates, that of the ordinary amœba, many other Rhizopods, as well as Infusoria (105) and plant cells. (106). In the green parts of plants which are withdrawn from the light the movements are extinguished, but in general only with the growth of the plant, according to DUTROCHET (107) in *Chara* after 24 to 36 days, for example: In certain cases the arrangement of the protoplasm is noticeably changed by the long continued effect of light or darkness.

The plasmodium of *Ethalium* creeping in the darkness upon the surface of the oose, draws itself up into the deeper parts upon being exposed to bright light. The same develops in light only short compact processes, but in darkness it sends out long and thin branches. (108). Illumination here seems to act similar to artificial irritation. It is known that changes of illumination result in modifications in the form of the contractile pigment cells of many fishes, amphibians and reptiles, changes upon which depend the variations in color of these animals. The black pigment cells from the skin of the frog which in the dark are widely branched contract gradually in bright light to little spheres, in consequence of which the skin becomes clearer.

Yet the light seems to act mostly by an indirect influence upon the contractile elements through the nervous system. According to LISTER (109) and G. POUCHET (110), it is a special influence, with a reflex from the eye.

105. From foreign and private observations.

106. Compare JUL. SACHS, Ueber den Einfluss des Tageslichtes, etc. Botan. Ztg. 1863. Supplement; W. HOFMEISTER, Die Lehre von der Pflanzenzelle. p. 49, 1869. G. KRAUS, Ueber Versuche mit Pflanzen in farbigen Lichte. Sitzungseber. d. naturf. Geseelsch. zu Halle, v. 20. May, 1876; Botan. Ztg. 1876. p. 504. (Yellow light exerts no influence upon *Hydrocharis*, *Trianea*, *Chara*, *Vallisneria*, *Elodia*, *Pilobolus*, *Urtica dioica*, *Navicula*).

107. DUTROCHET, Compt. rend. II, p. 779, 1837.

108. W. HOFMEISTER, Die Lehre von der Pflanzenzelle, p. 21. —

BARANETZKY, Influence de la lumière sur les plasmodia des Myxomycètes. Mem. Soc. des scienc. Nat. Cherbourg. XIX, p. 321, 1875. Found the blue rays to be especially potent, the yellow not.

109. JOS. LISTER on the cutaneous pigment system of the Frog. Philos. Transact. Roy. Soc. CXLVIII, p. 627, 1859.

110. G. POUCHET, Sur les rapides changements de coloration provoqués expérimentalement chez les poissons. Compt. Rend. LXXXII, p. 866, 1871. Compare further—G. SEIDLITZ, Beiträge zur Decendenz theorie. Leipzig, 1886, where a list of the works treating upon the color changes in animals is given.

The behavior of the protoplasm of *Pelomyxa palustris* is a deviation from all other known cases. (111.) This great fresh water amœba-like organism creeps about quite vigorously in the dark, but upon being suddenly illuminated (diffused daylight is sufficient) it will within a few seconds assume a spherical shape—the granular streaming having previously ceased. Continued illumination is regarded but slightly and the movements are resumed. Gradually replacing the darkness by daylight (say in the course of fifteen minutes) has no irritating effect. Neither has a sudden darkening after continued illumination. Supplementary to this may be the fact that in heavily and continually shaded places the germ leaves of phanerogams as well as mosses, and the prothalli of ferns assume a darker color, subsequent to a slow change of position in the chlorophyll granules enclosed in the protoplasm. This change increases under the influence of light, especially under the short-waved rays, particularly in that side of the cells turned toward the surface of the leaf. In darkness it is particularly in the lateral walls of cells standing perpendicular to the surface. Although these changes evidently depend upon movements of the protoplasm, it yet remains uncertain whether the influence of light is exerted directly, or whether it may not act indirectly through primary changes in the chlorophyll granules. (112).

4. MECHANICAL IRRITATION.

All sudden mechanical interferences act alike as mechanical irritants, pressure, pulling, crushing, tearing, the appearances are essentially such as follow electrical irritation.

As much as one hundred and twenty years ago ROSEL (113) observed *Amoeba* draw themselves together in consequence of being touched. After heavy pressure colorless blood corpuscles, rhizopods, etc., draw in their processes, often becoming varicose. The currents

111. TH. W. ENGELMANN, Ueber Reizung contr. Protöpl. durch plotzliche Beleuchtung. Arch. f. d. ges. Physiol. XIX. p. 1.

112. COMPARE, J. BOHM, Sitzgsber. d. Wiener Acad. XXI. p. 476, 1856; XXXVII. p. 475 1859; XLVII. p. 552, 1863.

A. FAMINTZIN, Jahrb. f. wissensch. Bot. VI. p. 1. 1867.

BORODIN, Mel. biol. Peters 6, VI. 1867. VII. 1869.

FRANK, Jahrb. f. wissensch. Bot. VIII. p. 216, 1871; Botan. Ztg. 1871.

Nos. 14 and 15 JULES SACHS Ber. d. Sachs. Ges. d. Wiss. Mathem. Phys. Cl. XXII. 1859. Lehrb. d. Bot. 4. Edit. p. 722, 1874.

113. ROSEL VON ROSENHOF, Der Monatl. herausgeg. Insekten belustigungen dritter theil, p. 621. Nurnberg, 1655.

in the plasmodia of *myxomycetes* may be brought to a complete standstill, or else hindered for some time by means of agitation of any kind (114).

The protoplasmic threads of the stamen hairs of *Tradescantia*, when momentarily subjected to moderate crushing, become knotty, break, and draw themselves together into club-shaped or spherical masses, finally coalescing, partially with the protoplasm accumulated about the cell nucleus, and partially with that lying along the cell wall. In from ten to fifteen minutes the ordinary arrangement and movement is resumed (115). GOZZI (116), DUTROCHET, and others have observed the cessation of rotation in the cells of *Chara* after ligation or bending. DUTROCHET (117) observed in *Chara* a cessation of rotation of one minute's duration, after section or puncture of the cells. It is undoubtedly due to mechanical irritation that freshly made preparations of *Chara*, *Vallisneria*, etc., show only motionless protoplasm, the movements beginning, however, after the preparations have had a period of rest (118). The same thing occurs with diatoms and *Oscillaria*.

5. CHEMICAL IRRITATION.

The same effects will often be observed after sudden chemical invasion as after electrical irritation; but many complications and disturbing secondary appearances here come in play (as shrinking, swelling, coagulation and the like), so that it is in comparatively few cases that the precise form and duration of the irritative influence is observed. Chemical irritants may effect sudden changes in the humidity of protoplasm. DUTROCHET (119) placed some chara in a solution of salt of about 1 per cent.; in four minutes the movement had ceased, and in eight minutes later it had been resumed. Gradually it became very rapid, and continued thus for ten days. A similar preparation, in which the movement had become very lively from a two hours' immersion in the same salt solution, was placed in pure water of the same temperature, which was followed after four minutes by a cessation of movement of five minutes' duration.

114. A. DE BARY, Die Mycetozoen, 2 edit., p. 49. Corroborated by W. HOFMEISTER, Die Lehre von der Pflanzenzelle. p. 26.

115. W. HOFMEISTER, place already referred to, p. 50.

116. GOZZI, in Brugnatelli Giornale de fisica. 2 Dec., p. 199. 1818.

117. DUTROCHET, Compt. rend. II., p. 781. 1837.

118. HOFMEISTER, place already cited, p. 50.

119. DUTROCHET, Compt. rend. II., p. 781, 782. 1837.

HOFMEISTER (120) says, after observations upon *Chara*, *Vallisneria*, *Hydrocharis*, and *Tradescantia*,—"a cell containing streaming protoplasm, upon being treated with a watery solution of a substance, which is not directly detrimental to the life action of the plant, but of a concentration sufficient to cause the rapid drawing together of the protoplasmic contents of the cell, arrests for a short time its streaming, that is, during this contraction of the protoplasmic contents; but this rapid streaming soon begins again on the inside of the cortical layer."

By the sudden dilution of a solution in which is immersed a cell with heavily permeable membranes (e. g. a leaf cell of *Vallisneria*, or a root-hair of *Hydrocharis*), a transient cessation of the current is seen to set in (121).

Fresh water *Amoebæ* which I had accommodated to salt water of 2.5 per cent., contracted themselves violently upon the addition of a $\frac{1}{2}$ per cent. solution of sodium chloride; but after a few minutes began to move in the usual manner. CZERNY (122) made similar observations. Like observations have been made in regard to the influence of acids and alkalies. In potassium and sodium of 0.05 per cent., as well as in tartaric acid of 0.1 per cent., DUTROCHET (123) found the rotation accelerated after a delay of five minutes. KÜHNE (124) found after a slight application of the vapor of ammonia to *Actinosphaerium*, the processes became few, short, and strongly varicose, and to assume their ordinary form only after a long rest.

VI. THEORETICAL.

A theory of protoplasmic movement leading back to the physical and chemical processes, can not be deduced from the foregoing experiments. As it is essentially only the mechanical side of the process which is accessible to direct observation, a theoretical consideration must restrict itself to proof of the mechanism of the movements,

120. HOFMEISTER, place referred to above, p. 52. Compare also p. 27, where a corresponding observation on *Didymene serpulæ* is communicated.

121. HOFMEISTER, place referred to above, p. 53.

122. VINC. CZERNY, Einige Beobachtungen über Amoebæ. Arch. f. microscop. Anat. V. p. 158. 1869.

123. DUTROCHET, Compt. rend. II. p. 781. 1837.

124. KÜHNE, Untersuchungen über das Protoplasma, etc., p. 64 and 65. Compare also at the same place, p. 48 and 49 (*Amoebæ*); p. 82 (*Myxomycetes*). Further, M. SCHULTZE, Das Protoplasma, etc., p. 32 (*Actinosphaerium*); p. 37 (*Mitula*).

trusting that the future will furnish knowledge as to the nature and relations of the invisible molecular processes which lie at the bottom of the visible phenomena.

Every attempt at an explanation of the mechanism of protoplasmic movement must not only embrace all the known modifications of protoplasmic movement, but as HOFMEISTER (125) justly demands must be applicable in principle to the manifestations of contractility. The essential conformity which exists in regard to methods and conditions of appearance, and the gradual transitions which are so obvious, prove that the same elementary mechanism has to do with all manifestations of movement. As a starting point for a closer analysis of protoplasmic movement, we may take the recognized fact that each of the smallest microscopically indivisible particles, making up every protoplasmic mass, possesses the capacity of independent movement.

The evidence for this is provided by the changes of form and position which either spontaneously or in consequence of artificial irritation may proceed from all points of any resting protoplasmic mass, as well as from the smallest possible artificially isolated particles of protoplasm. Here follows as the next, and, as I believe, the most natural deduction; the statement that protoplasm may be an aggregate of extremely minute, contractile, irritable form elements, its movements being the result of the changes of form of these smallest elements. The existence and cause of the changes in form of these latter must remain for the present undecided. No ground exists for maintaining that the smallest protoplasmic particles perceptible with the microscope are these contractile elements, for one must think of them in general as still more minute—of molecular dimensions. In regard to their form—it is assumed that either their condition is one of maximum agitation or excitement—they may approach a sphere in shape, being in their quiescent condition stretched out, fibre like.

The foundation for the first assumption lies in that, subsequent to artificial irritation, the smallest protoplasmic particles accessible to observation, tend to assume a spherical form, provided they are not already spherical. In regard to the latter speaks at once the fact, that the smallest spherical masses of contractile protoplasm, after a cessation of any existing irritation, assume a stretched out, slim (fibre-like) form (pseudopodia, etc.). Secondly: resting, hyaline protoplasm

125. HOFMEISTER, *Die Lehre von der Pflanzenzelle*, p. 59.

undergoes not unfrequently (as has been previously described) a splitting up into extremely fine fibrillæ. Thirdly: the smallest discernible form-elements of other contractile forms (of ciliary organs, myophane, and muscle fibres) have in the quiescent condition a stretched out shape.

The mechanical performances of naked protoplasm teach that the changes in form, especially the shortening of the contractile elements, must take place with a force which would, in general, considerably outdo the force with which the elements, providing they were fluid, tend to become spherical.

For the sake of brevity the hypothetical contractile elements may be known in future as INOTAGMEN, whereby it shall be understood that it is within them that the force is generated which gives rise to contractions, and that they are represented as being in molecular union (Tagmen PFEFFER (126)). It is very likely that all inotagmen are positively uniaxial and doubly refractive; contractility in general seeming to be bound to positively uniaxial particles (127).

Both the active and passive manifestations of movement in protoplasm tend further toward the assumption that the inotagmen of protoplasm are not altogether like those of muscles and vibratile cilia as regards a relatively firm arrangement towards definitely fixed directions of the axis, but that they are in general united together loosely and heterogeneously, in relation to each other; not excluding however, the possibility of a transient or permanent grouping of a greater or lesser number of inotagmen to the direct formation of larger masses (fibres, membranes and the like). As a ground for the great dissimilarity of protoplasmic particles, we may be allowed, in accordance with the prevalent ideas regarding the molecular structure of organized masses, —to consider the proportionately significant quantity of absorption fluid which is found between the inotagmen and inotagmen groups, and that with the quantity of this fluid rises or falls the dissimilarity.

The ideas which we have thus developed allow us now to take the first steps towards the explanation of protoplasmic movements, in that the diversity of forms under which these movements appear and the

126. W. PFEFFER, *Osmotische Untersuchungen*, p. 32. Leipzig. 1877.

127. *Contractilität und Doppelbrechung*. *Arch. f. d. ges. Physiol.* XI. 1875.

changes which they undergo as the result of various influences, may be reduced to a single cause—the change of form of the inotagmen, although this explanation lacks precedent.

It may be permitted to analyse a few of the most important cases in this connection.

1. NAKED PROTOPLASM BECOMES SPHERICAL UNDER IRRITATION.

The simultaneous assumption of the spherical form by all inotagmen, demonstrates itself in that the superficial attraction which the same exercise toward one another, and the cohesion of the entire mass must evidently be alike at all places and in all directions.

A fair proof of the correctness of the latter conclusions is provided by the sudden assumption of the spherical shape by the air bubbles in the protoplasm of *arcella* upon electrical irritation. Since there is no diminution in the volume of the air vesicle it is plain that the assumption of the spherical form is not due to a mere contraction of the cortical layer of the protoplasm as is frequently supposed.

The force with which the approach to a spherical form takes place is essentially dependent upon the force with which the inotagmen change their form, and upon the mean amount of the cohesion of the protoplasm. The latter increases with the ascending capacity for water of imbibition, and the former (i. e. force of inotagmen change) power generally declines with the increasing quantity of the latter. The assumption of the spherical form may be actually prevented in very thin protoplasm, (many plasmodia for example). The phenomena of varicosity, withdrawal or melting away of fibre-like or membranous processes (pseudopodia, etc.,) easily explains itself after what has been said. (128).

128. We must in a word refer right here to *Kuhne's* experiment with the so called artificial muscle (Unters, ueber das Protoplasma u. s. w. p. 81), whereby a most important achievement is accredited to animal physiologists, and which would be of the highest merit if the construction put upon it by its author were correct. Assent may have been given to that which did not occur, proof must therefore be furnished (1) that the pulpy mass of protoplasm mixed with water and put into the intestine of a beetle, developed itself again as living irritable protoplasm. A resuscitation, for the probable failure of which there seems to be more evidence than its most expert author can offer for its success. (2.) The first condition having been fulfilled, all the little protoplasmic lumps must coalesce to form a single cohesive mass, for without this the "artificial muscle" was simply an aggregate of disorderly jumbled together amoebæ, by the synchronous contraction of all of which its form would not be perceptibly changed. Empirically the performance of this proviso is of the utmost improbability. From the fact that when, after a slight attempt at irrita

2. ORIGINATION OF PROCESSES.

While the protoplasmic mass may be reduced to the smallest possible extent of surface by means of irritants, and on the withdrawal of the irritant, all the inotagmen stretch themselves out, yet a change in the form of the entire mass does not necessarily follow.

It is generally only partial, this being referrible to the inequilateral and inequipollent stretching of the masses of inotagmen arranged in parallel directions. THE SPHERICAL CONDITION OF A NAKED PROTOPLASMIC BODY MAY AS WELL BE DUE TO COMPLETE REST (relaxation) AS TO MAXIMUM IRRITATION (contraction of the inotagmen). The formation of processes is possible in other ways than merely through the stretching out (relaxation) of definitely directed instagmen groups, which lead to the easily formed, thin pseudopodia. One of a great collection of cases is that lately communicated by O. F. MULLER, in which *amœbæ* and amœboid masses, exhibiting usually hyaline forms, take on a marked convexity, like the segment of a sphere, in which is crowded the granular endoplasm. This has as a cause the taking on of a general contraction by the inotagmen of the convex portions of the hyaline cortical layer. As is shown by the apparently unapposed movement of the streaming granules the cohesion of the interior portions of the hyaline processes does not differ much from that of a fluid. In pursuance of the study of animal physiology ECKER (129) first expressed the idea that in *amœbæ* the pseudopodia are pressed out by a contraction of the protoplasm lying behind. Yet DUJARDIN thought and DEBARY (130) afterwards pointed out that the cause of the forward movement of the mass must arise at the point towards which the movement tends. DEBARY accounts for it as a spontaneous "relaxation

tion, the contents of the "muscle" was turned out it consisted in part of single knobby masses, partly of pale bubbles and free granules from which no further manifestations of movability developed. It appears to be directly proven that neither was the first nor yet the second condition fulfilled.

C. E. BESSEY describes this curious experiment of *Kühne's* as follows: Taking a portion of the plasmodium of *Didymium serpulæ*. In its resting state, he mixed it with water so as to make a pulpy or pasty mass. with this he filled a piece of the intestine of a water-beetle, and tying the ends, laid it across the electrodes of an induction apparatus. The preparation was kept in a film of water in a damp chamber for twenty-four hours, at the end of which time it was considerably distended. He now allowed the electrical current to pass through it, when it contracted itself "like a colossal muscle-fibre." Upon extending it by pulling at the ends, and then sending through it a stronger electrical current, it contracted itself one-third of its length.—Trans.

129. ECKER, Ztschr. f. wissensch. Zool. I. S. 235. 1849.

130. DEBARY, Die Mycetozoen. 2. Aufl. S. 47 f. 1864.

and expansion in consequence of which the granular stream is set into motion towards the process, whether it be by ingurgitation, like water running into a porous body, or whether it simply tends towards the point of least resistance." HOFMEISTER emphatically combats the general belief, especially upon the ground of the fact that the granular streaming increases backwards, from the point towards which the movements tend. (See above under amœboid movements). It has been well observed, that by contraction of the cortical layer of the portions lying behind the streaming, we would expect to see a smooth-stretched, spontaneously shrinking surface developed, which however is not to be perceived. On the contrary, as one may see in every amœboid mass having a rapid forward motion, the surface of the rear portion of the body is wrinkled and fissured, if not entirely cleft into fibres through the rapid decrease in volume. It nevertheless happens, at least according to DEBARY, (131) that in Myxomycetes the processes are sometimes formed according to the old view. In this case DEBARY asserts that the protoplasm contracts behind the current, the rapidity of the latter being diminished towards the point to which it is directed. In a like manner progressive local contractions of inotagmen groups may cause differences of pressure in the interior, and thereby streaming and displacement of easily moved masses. The next view, however, illustrated by BRÜCKE (132) in *Urtica*, is untenable after what has been said; since it considers that the behavior of protoplasmic enclosures in regard to movement is analogous to the movement of a fluid contained in a tube, from the contraction of the enclosing walls. (133).

COMMENTS. It is of course apparent that the formation of processes and currents may be induced merely through a shrinking of the cortical layers, independent of any physiological contraction, (thus by partial drying, which for example often occurs with large plasmodia, or through coagulation of albumen, succeeding for instance, super-maximum electrical irritation. And it also becomes a matter of course, particularly in the case of experiments with artificial irritation. that every variety and combination of the various modes of origination of processes and currents heretofore described may happen.

131 DEBARY, Die Mycetozen. 2. Aufl. S. 47 f. 1864.

132 BRÜCKE, Sitzgsber. d. Wiener Acad. Mathem.-naturw. Cl. XLVI. 1863.

133 Vgl. auch die Widerlegung der *Allgemeingültigkeit* dieser Ansicht durch M. SCHULTZE. Das Protoplasma u. s. w. S. 51 f. Ferner A. DEBARY, Ueber den Bau u. das Wesen der Zelle. Flora 1862. S. 249.

3. ROTATION OF PROTOPLASM WITHIN A FIRM CELL WALL.

This must cease if the inotagmen of the spontaneously moving layers are arranged in general with their axes parallel to the direction of movement, and the stimulus continues in this direction. The moving protoplasm then creeps upon the stationary cell wall like a snail upon any firm substance.

4. ARREST OF SPONTANEOUS MOVEMENTS BY MEANS OF ARTIFICIAL IRRITATION.

As previously indicated the first result of artificial irritation is usually a cessation of movement, or a retardation of the evidently spontaneous movements directly at the irritated point. Superficially regarded it might seem in all these cases not so much as if an excitation had occurred but rather a disablement of the protoplasm, a supposition which is especially supplied by plant-physiologists. However according to our manner of representation, the opposite must be the case, and it is easily demonstrated that the result can be no other than what has been noted.

Now! all the inotagmen which have not already contracted, do so when the motive impulse is essentially equal at all points. It is the same as when all the muscles of an animal are at the same time excited to the maximum, that not only a repression of all normal movements, but also of the natural contour must exist. Having thus referred the movements of protoplasmic masses to the active changes in form of small particles; (inotagmen) the present difficulty consists in explaining the mechanism of these changes in form. We must however for the time being limit ourselves to a few hints, which will perhaps serve more as suggestions for further investigation, than for the solution of the problem. (134). According to the ground taken, the mechanism can be none other than that which lies at the bottom of active changes of form in muscles and ciliary organs. It can no longer be doubted that the changes in form of the contractile particles of muscle go hand in hand with changes of humidity and turgescence. As a matter of fact the contractile, doubly refractive sarcomeric elements of the striated muscle fibres become swollen during a vigorous shortening, through the absorption of fluid from the isotropic noncontractile intermediary layers.

134. Compare several papers in Arch. f. d. ges. Physiol. VII. p. 33, 155. (and especially p. 176), 1873; VIII, p. 95, 1874; XVIII, p. 1, 1878.

upon stretching out this fluid it again returned to the latter. By producing artificially a swelling of the doubly refractive sarcous elements or disks of the striated muscle, referred to above, a characteristic shortening takes place, (even when the muscle has become no longer irritable.) This is true also of cilia.

It is now known to be the common rule that inisodiametric and doubly refractive forms ; plant or animal, living or dead, tend to shorten themselves (often with great force), and always in the direction of the optical axis by the absorption of water. (Swelling).

It is allowed that the most immediate cause for the change of form in the inotagmen of protoplasm, (as in other contractile substances), depends upon changes of humidity, the nature of the contraction depending upon the peculiar manner of swelling.

W. HOFMEISTER (135) proceeding from the diversity in the behavior of protoplasm for the imbibition of water, sought the nature of the movements themselves in periodical madeffective changes of the ultimate protoplasmic particles. He took into account however only volume,—not form changes of these ultimate particles ; which was not sufficient to account for relative extents of the shortening and lengthening observed in many instances. He was not aware of the process of swelling which takes place in the contraction of muscle.

The further analysis of the mechanism of the restored process of contraction in an undoubtedly lifeless body (e. g. connective tissue fibrillae dried, or hardened in absolute alcohol), may be left to the physicists. As far as physiologists are concerned, it remains only to ask what induces the madeffective changes of the inotagmen implied by the appearances of physiological contraction. This however is probably the point which the chemists will have to supply. In regard to it the present condition of our knowledge renders it idle to express further conjectures.

135. W. HOFMEISTER. *Die Lehre von der Pflanzenzelle.* p. 63, 1867.

On the 8th of March, Portsmouth, Va., had a case of death from chloroform administered previous to the extraction of some teeth. The victim was the wife of a physician of the place.

IMPROVED METHOD OF ATTACHMENT OF CROWNS.



FIG 1. In my method of setting artificial crowns, I claim simplicity of construction, firmness, durability, and arrest of decay of the root (Fig. 1). From the following description of my method it would seem that a failure would be almost impossible. To protect the end of the root from decay, and to obtain a strong hold for an artificial porcelain crown, a gold band, properly applied, must be of the greatest benefit. I am aware of the fact that gold bands have been applied, but I am convinced that their adaptation after any of the old methods is defective. What I claim in my method is the preparation of the neck of the root by a set of instruments especially constructed for that purpose. These instruments enable the operator to obtain as nearly perfect adaptation between the gold band and the root of the tooth as can possibly be made. With reference to the upper centrals, laterals, and canines, as well as the corresponding lower teeth and bicuspid, there can be nothing more favorable than the application of this method. It is true that this process cannot be applied with the same advantage to the upper bicuspid or any of the molars, but I hope in time, if I am in any way supported by the profession, to solve that problem. I believe I will succeed in constructing a set of instruments which will prepare a root, the pulp of which is alive and may if healthy be readily kept so. But as this set of instruments is not quite completed, I will abstain from its description, and only allude to the setting of crowns which require the devitalization of the pulp, unless this organ has previously died. With these instruments a circular shoulder is turned on the neck of the root.

The alteration of the neck of the root, from an irregular cone to a cylindrical form, enables us to adapt a corresponding ring or cap. Such a cap, when fitting accurately around as well as upon the end of the root prepared by these instruments, forms an air-tight joint and conse-

FIG. 2.



FIG. 3.



FIG. 4.



quently protects it from decay, at the same time giving the porcelain crown, when attached, a firmness which heretofore has never been obtained. The set of instruments by which the neck of the root is prepared consists of drills, reamers, and trephines. The drills (Fig. 2) are used to enlarge the root-canal for the guidance of the reamer or facing instrument and trephine. The reamers (Fig. 3) cut the surface of the root down as far as necessary. They produce a perfect level surface and have a center-pin, which

FIG. 5.



corresponds with the hole made by the drill in the center of the root, and acts as a guide. The trephine (Fig. 4) has also a center-pin, and is used to make the root cylindrical below the free margin of the gum. A set of these instruments includes different sizes of drills, with reamers and trephines corresponding in size adapted to various diameters of roots.

The ferrules or caps (Fig. 5) to fit roots which have been prepared by the above instruments are of gold, made by steel dies. They correspond exactly with the trephine in diameter and depth with allowance for sufficient expansion of the gold when forced on to the shoulder of the root, whereby a most perfect joint between cap and root is obtained. They have a stout central pivot which fits the hole in the root and gives increased strength and firmness.

FIG. 6.



The pulp-canal is enlarged with one of the drills selected with reference to the size of the root. A reamer corresponding in size is used with the dental engine to cut the root down to a perfect level. The trephine is applied in the same manner to give a cylindrical form to it, thus completing the shoulder (Fig 6).

A steel wire corresponding in diameter with the drill which has been employed is now introduced into the root, projecting out about half an inch. It serves to indicate the exact direction of the root-canal. An impression-cup is selected with an opening opposite the missing tooth

to take an impression of the root and adjoining parts. The object of the opening is to give free transmission to the wire in the root-canal. The wire protruding through the cup and impression-material is drawn out carefully before the removal of the impression-cup, which is then removed and the wire placed in its proper position in the impression. A set of brass root-models (Fig. 7) corresponding in size with the instruments accompany them; one of these bearing the same number as the instrument with which the root has been prepared, is now placed on the wire in the impression, and serves to represent the prepared end of the root on the model. The impression is now ready to be filled with plaster. After the cast is obtained, we find the root-model im-

FIG. 7.



bedded in the plaster and the wire in its center-hole. The wire is now removed and the plaster cut from around the root-model to the depth of the gold cap, which is ready to be placed upon it. A plain porcelain tooth (Fig. 8), as used in plate-work, is ground hollow on the inner surface to cover the outer front wall of the cap, thus hiding the

FIG. 8.



gold. Thin platinum backing is now adapted to the tooth, which is then ready to be placed in position on the model over the gold cap, and fastened thereon with hard wax. The united parts are removed carefully from the model, invested in sand and plaster and soldered. After polishing, the cap is ready to be forced upon the root by placing a piece of wood on the cutting-edge of the tooth and driving it home with a mallet.—BUTNER, *Dental Cosmos*.

ENGLISH UNIVERSITIES.

England now has five universities; formerly there were only two. Scotland has four, two having been united. Oxford and Cambridge have existed for many centuries as fully appointed universities. The university of London is not properly a university, but merely an examining body for granting degrees, and it does that kind of work thoroughly. The university of Durham is new and not yet prominent. The new university at Manchester is the outgrowth of Owens College, and was originally endowed, like the Johns Hopkins, by a private founder, afterwards by subscriptions. It has become known chiefly by

its work in natural science, but desires to encourage humanistic studies equally. We anticipate a great future for it. None of the English or Scotch universities are denominational; none have now (since 1871) religious tests, except that the established church in both England and Scotland has possession of the theological faculties. English universities are self-governed, except London and Manchester, which are controlled respectively by a senate (named by the Crown) and by a board of trustees. The constitutions of Oxford and Cambridge are very complicated and are understood by nobody outside the universities and by few inside. Ancient usage, modern Acts of Parliament, and their own legislation have all gone to the making of them. These university governments have two modern assemblies, called in Oxford "Convocation" (made up of alumni having degrees) and "Congregation" (made up of graduates resident in the university town). These latter appoint the University Council, and all university statutes must pass through the three bodies.

In the matter of teaching, the Scotch universities are much like American colleges. The methods are catechetical; teaching is regarded as more important than examinations; prizes are in vogue and exercise great influence. In Scotland, prizes are usually awarded by vote of the students. Practically, the system works better than would awards by the professors. Prizes generally go where they belong. The Scotch universities are cheap, because the fees are low and the students live where they please. Their conspicuous and distinctive merit lies in the great stimulative power of their teaching. In England there is, with less of this stimulus, perhaps more of finished scholarship and greater opportunities for an enjoyable social life. There are three sets of teachers in the English universities: (1) the professors, who have hitherto taken a part in the teaching more dignified than practically important, except in natural science, where they have had nearly all the work to do; (2) the tutors and lecturers, who bear the burden of practical work and give their instruction in connection with some college independent of the university proper; (3) private tutors, or "coaches," from whom forty years ago came nearly all the instruction at English universities, but who are now much less active, because both university professors and college teachers have become far more efficient than they were then. In England, examinations have become the main thing, and practically control the teaching, although the true view of them would rather be that they should exist as a test of teaching. The examinations, though very old, had become purely formal in the last

century: their present importance is comparatively recent. In the Cambridge Triposes, students have heretofore (for a change is now being made) been arranged according to merit. At Oxford the arrangement has been into classes, according to merit, the successful men being arranged alphabetically in each class, so that it is not known, unless the examiners give private information, where a man really stands in the class he has reached. Students are the more ambitious to reach as high a class as possible, because fellowships and success, in such a profession as schoolmastering, depend, to a considerable extent, upon such rank.

The fellowships yield from \$750 to \$1,000 a year. Most of them are at Oxford awarded for proficiency in the same studies as are required at the examinations in the various schools of the university. There is hence difficulty in England in causing students to follow any lecture course or branches of liberal culture which do not count towards their examinations in the schools, or towards a fellowship. Among the practical university problems of the day are: (1) the reduction of expenses for students. The necessary cost at an English university is from \$600 to \$1,000 a year. (2) The creation of a more complete system of preparation for the leading professions. Something has been done towards the promotion of training for clergymen and for lawyers. Oxford and Cambridge have deficient facilities for training, because the towns are too small to support great hospitals. Natural science is now everywhere encouraged. (3) Ampler provision is required for teaching in a great number of more recondite subjects, and encouragement should be given to men, who do not intend to pass through the whole university course, to come and attend lectures on these subjects. (4) Something should be done to enable the university to help original research, and to increase the number of residents who devote themselves to the pursuit of learning. At present large funds are wasted in what are called "prize-fellowships." Unfortunately, the land revenues of the colleges have suffered from the competition of western America, and money is wanting to carry out some of the most desirable improvements. Broadly considered, the advantages of English university education may be said to consist in the combination of college and university life. The Scotch universities afford efficient class teaching; the German universities give the fullest instruction by professional lectures; the English universities excel in social advantages and in opportunities for forming valuable friendships. The excessive

development of their examination system has certainly injured their teaching; but it has been improving in compass as well as in earnestness, and seems likely to improve still further.—BRYCE, *Johns Hopkins University Circulars*.

SIMPLE METHOD OF EMBEDDING SMALL BODIES.

In every treatise on microscopical manipulation there are given directions for embedding for section cutting, but the writer has devised a method for small bodies which possesses several advantages. The *modus operandi* is as follows: The substance to be embedded is hardened after any of the usual methods and placed, from alcohol into turpentine and then transferred to a saturated solution of paraffine in turpentine, the same as in all methods of paraffine embedding. Here is where the novelty comes in. The specimen is removed from the mixture and the superfluous fluid removed by means of blotting paper and then placed on the end of a cylinder of paraffine (or paraffine and vaseline). A bit of stout iron wire is now heated in the flame of a spirit lamp, and with it a hole is melted in the end of the cylinder, and the specimen then pushed into the melted paraffine and placed in any desired position. The advantages of the method are: the quickness with which it may be performed, for from the time when the operation is begun until sections can be cut is not over three minutes, while the melting of so small an amount of paraffine prevents any injury to tissues by overheating. In embedding solid bodies, a slight variation sometimes results in the saving of more time. The specimen may be embedded directly from alcohol without the intervening turpentine, and then when the section is cut it readily separates from the shaving of paraffine without the use of turpentine to dissolve it. This, of course, applies to solid bodies without cavities or irregular outline.—*Scientific and Literary Gossip*.

DIAGRAM OF A TOOTH.

A good illustration of any object is the most forcible, concise, and effective means of conveying to the mind the objective aspects of form, structure, and relation. Therefore is it on account of the value of such aid to comprehension that the work of the artist is so largely taken

advantage of as an educational means. Some illustrations, as mathematical drawings and photographic productions, may be regarded as absolutely correct; and, while others represent nature in various degrees of faithfulness, there are those mere sketches or crude outlines which serve most usefully as class-diagrams. The "Diagram of an Incisor Tooth," now before us, can be justly classed as a good specimen of the last group, and it has been produced, "under the direct supervision of Prof. Frank Abbott, M. D.," and published "by special request of the Dental Society of the State of New York." It is also stated that "the object was to give to the Dental Profession a correct idea of the minute anatomy of a tooth. If not absolutely perfect microscopically, it approximates so closely to nature that it conveys to the mind at once an intelligent understanding of the structure and relations of the organ."

To justify our classification of this "Diagram," we shall mention some items that are set forth as giving "a correct idea of the minute anatomy of a tooth" that are not generally recognized by histologists, and, at the same time, make a few other observations.

That rudimentary layer of cementum on the crown of a tooth known as Nasmyth's Membrane, is here depicted and described as "epithelium of gum reflected over crown of tooth, forming Nasmyth's Membrane"! The odontoblasts, in many instances shown as spherical, have not that well-defined columnar form so readily observable; neither are the contents of the dentinal tubes—the dentinal processes of the odontoblasts—in any instance depicted as coming from the central part of outer periphery of the cells, but in all cases from between the cells of the *membrana eboris*. "The direct connection of the non-medullated nerve-fibres with the odontoblasts, and the passing of those fibres between these bodies into the dentinal canaliculi," are conditions not taught in this country as ascertained or demonstrable facts. There is not represented that superficial interglobular portion of the dentine of the root of the tooth known as the granular layer. And while the osteoblasts of the periosteum are delineated in contact with the cementum, none are shown in relation with the bone of the alveolus, neither are any other histological elements than fat-cells painted in the cancelli. The epithelial elements of the gum are shown as being all of similar form, instead of in three varieties, including the deep columnar cells of what is sometimes called the *rete mucosum*.

The foregoing faults and shortcomings are sufficiently numerous and significant to render this "diagram" incapable of giving "a correct idea of the minute anatomy of a tooth." If less had been pretended, criticism would have been less severe.—T. G., *Dental Record* (Eng.).

NATURE'S SURGERY.

In view of the care that is taken to reset a broken bone or heal a wound when the afflicted party belongs to the genus *Homo*, the amount of injury that wild animals can sustain and recover seems surprising. Animals, too, are much more liable to accidents than one might at first suppose, and although man is probably responsible for far more suffering than nature causes, yet disasters happen in one way or another to many beasts and birds. When we see monkeys in captivity agilely skipping about their cages, springing from branch to branch without once missing their hold, it is difficult to imagine them catching a tumble. But an examination of numerous skeletons shows that they do occasionally come to grief in a very serious manner, and that monkeys no more than men can climb with absolute immunity from harm. Out of a dozen or so of large Neilgherry Langurs, two had broken femora, and a specimen of the Proboscis monkey must have suffered severely from a similar mishap, for although the bone had re-united, yet exostosis caused by inflammation had set in to such an extent that there was a deposit three-quarters of an inch thick for two-thirds of the length of the bone. Two large Orangs were found with the humerus broken, and in one individual the injury was of such old standing and the union of fracture so perfect that the bone by itself would hardly attract attention. But when compared with its fellow it proved to be $1\frac{1}{2}$ inch shorter and revealed the situation of the break by its superior thickness and rugosity.

In all of these cases the injured limb was one of those most necessary to the animal's locomotion, for the smaller monkeys, which *leap* from tree to tree, had their hind legs broken and the large apes, whose bulk forces them to swing carefully from one branch to another, had suffered in their fore legs. Hence from the nature of the case the repair of the injured member must have taken place under many disadvantages; and yet nature unaided performed a much better piece of

work than did Dr. Livingstone for himself, in the African forests, with his knowledge of surgery. In fact, had the fracture been repaired by a surgeon it would have been called a very successful operation.

Small animals, especially in settled districts, are subject to frequent accidents from traps and trappers. Among other victims that have come under my notice, two, a turtle and a porcupine, had one fore leg completely amputated, the former below and the latter above the elbow. In this last instance the accident must have taken place when the animal was quite young, for externally the stump was scarcely discoverable, even by touch, while internal examination showed that the scapula was considerably atrophied.

About the only instance of a broken leg among birds—aside from gunshot wounds—was in a small Blue Heron, in which the metacarpus had been fractured diagonally and re-united; the slipping by of the two portions shortening the leg only about a quarter of an inch.

Broken ribs, as may be supposed, are of frequent occurrence and are found not only among land animals but among cetaceans, whom one would naturally suppose to be removed from the danger of such accidents. A specimen of *Hyperoodon* twenty-two feet in length bore evidence that two of its ribs had been broken, and that, too, after the animal had arrived at maturity. I have seen both Moose and Elk with ribs broken and perfectly re-united, and an *Echidna* had completely recovered from a fracture of no less than six ribs. One might imagine that snakes, with their many slender ribs, would be particularly liable to injury, but such does not seem to be the case, although I have met with one which has sustained a dislocation of the vertebral column without apparently more serious results than a permanent crook in the back. Turtle, to whom a broken rib must be a rather serious affair, are not infrequently found with sadly distorted carapaces, showing that like Lady Jane, they must have been "crushed" at some time. I recall one specimen of *Malacodemys palustris*, which seemed to have been run over by a wagon when young and had four ribs and three vertebræ broken, and yet had recovered completely from these injuries. Such recoveries as this recall Magendie's remark, that in recovery from sickness "Nature does much, good nursing much, doctors devilish little." To have a tail interrupted that should have been continued, is a comparatively harmless accident and one that not infrequently happens, although sometimes the results are peculiar. Gunther figures a Pike

very much abbreviated and very old looking, and a Mud Turtle, brought to us last summer, had a tail terminated by a ball nearly an inch in diameter. I am tempted to introduce here the story of the Elephant Rats, from Algeria, which resembled the ordinary rat except that its nose terminated in a proboscis nearly an inch in length. The species proved to be the creation of some enterprising French Zouaves, who whiled away their time by grafting the tail of one rat into the nose of another, and when they had united, cut off any required length of proboscis.

Turning from one end to the other, I have noted two cases in which an animal's jaw had been broken, one an Indian Wild Hog (*Sus cristatus*) and the other a small Deer. In the first case the union of the fractured parts was complete, while in the second instance the broken edges were still separated, although exostosis had increased that portion of the jaw to four times its original size. Not only do Orangs break their legs, but it would seem that they occasionally break their heads also, since among various specimens examined, there was one showing an ugly looking dent in the skull, which must have been caused by some fracture healed long ago without trepanning. All of the above noted cases were apparently caused by accidents, with which man had nothing to do, except possibly in the case of the three-legged Porcupine, but the few succeeding examples illustrate recoveries from gunshots wounds: One interesting specimen was an Orang with a bullet imbedded in its jaw and almost completely hidden beneath newly formed bone. A Mountain Sheep exhibited a somewhat similar case, having the ball firmly fastened in its tarsus. A more peculiar example was related to me by a friend, who extracted from the humerus of a bird a shot which had pierced one side and lodged in the air cavity of the bone. Afterwards the hole had completely closed, and the injury would have escaped notice had not attention been called to it by the rattling of the bone. The scapula of an Elk, bearing a partially closed perforation, bore witness to the fact that its owner had escaped death once, only to fall under a second and much later shot. Last of all I will mention the skull of an Elephant which had been pierced through and through by a ball, without death having ensued; but this is not so remarkable as it might at first seem, since the course of the ball was through the air cells above the brain cavity, and the wound probably caused nothing more than a severe headache. The conclusion drawn from these varied instances is, to let well enough alone and in case of injury merely to see that nature is not too much impeded by art.—LUCAS, *Ward's Natural Science Bulletin*.

THE POLYGLOTWOGGLE.

It has long been my pleasure to scan
 The progressions of life on the earth ;
 And now I will tell, if I possibly can,
 In the plainest of English, the story how man
 From the Polyglotwoggle had birth.

For I am a scientist true.

With learning's most classical lingo.
 When I found an old tooth, which to science was new,
 I restored the whole beast, hoof and horn and tail too.
 And I called it the Hip-pip-o-jingo ;

Which means—but no matter. It's Greek.

Thus I won the Academy roses.
 And the Royal Society asked me to seek
 A few fossil remains which would aid me to speak
 On the Genesis theme against Moses.

So I sought, and I found a huge fossil,
 In the Bad lands of Western Dakota,
 With a tail like a comet, a head most colossal,
 And forty-two tongues sticking fast to his jaw still ;
 So I called it, in Greek, Polyglota ;

Which means many-tongued ; and moreover,

Since its eye had the form of a *goggle*,
 While its *polliwog* tail proved the beast a sea-rover,
 In order *both* characteristics to cover,
 I called it the Polyglotwoggle.

When the sea rolled its fathomless billows
 Across the broad plains of Nebraska ;
 When around the North Pole grew bananas and willows,
 And mastodons fought with the great armadillos
 For the pineapples grown in Alaska ;

When the Glyptodon came to the ocean,
 The Plesiosaurus to ogle,
 But could find not a word to express its emotion—
 Then there came a fantastic, most singular notion
 To the brain of the Polyglotwoggle.

" Every tongue I will study," it said,

" From the ape's to the great alligator's ;
 For have I not forty-two tongues in my head ?
 They laugh at me now, but they'll call me, instead,
 The most learn'd of all beastly translators."

All its heart in the effort it threw
 Till its learning became the world's wonder ;
 But alas ! when it tried to converse with the gnu,
 And puckered its lips to pronounce the French u,
 Its tail split completely asunder !

Then on the two pieces it rose,

And it cried, " I'll succeed if I can !"
 While the tips of its tail were turned up for its toes.
 And it walked ! The first biped ! so synthesis shows.

And the Polyglotwoggle was Man ?—FISK, *New York Independent*.

SEEMINGLY A PARADOX.

Although an accurate impression is a prerequisite in making a perfect fitting plate with atmospheric pressure, yet there are many mouths which cannot be fitted from accurate impressions. This may seem paradoxical, but yet it is so; and the young practitioner who thinks that success is assured him because he has learned to take perfect plaster impressions, will become demoralized in this direction before many patients patronize him.

In many cases it is necessary to cut away the plaster casts in certain parts and manipulate a trial plate before a pressure can be established, so variable are the gums in thickness and density.—TEES. *Dental Office and Laboratory.*

AGENCY OF MICRO-ORGANISMS IN DECAY OF HUMAN TEETH.

The general results which I have arrived at may be summed up in the following paragraphs, partly in accordance with and partly contrary to the commonly-accepted views :

1. The first stage of caries of the teeth, *i. e.*, the extraction of the lime-salts, is for the most part caused by those acids which are generated in the mouth by fermentation.

2. Decalcification of the enamel signifies total destruction of that tissue; of the dentine there remains after decalcification a tough, spongy mass, which becomes subject to the invasion of enormous numbers of fungi (leptothrix-threads, bacilla, micrococci, etc.).

3. The leptothrix-threads are found, with rare exceptions, only upon the surface, or in the superficial layers of the softened dentine, and appear to take but a small part in the invasion. The bacilli, on the other hand, penetrate far into the dentine, even into the finest branches of the canaliculi. Micrococci penetrate furthest.

4. In the separate tubules is frequently to be seen a gradual change from leptothrix-threads to long bacilli, from long to short bacilli, and from the latter to micrococci.

5. The fungi produce anatomical and pathological changes in the deeper layers, stop up the canaliculi, and necessarily lead sooner or later to the death of the dentinal fibrils. The outer layers of dentine, thereby deprived of nourishment, die and fall a prey to putrefactive agents.

6. The invasion of the fungi is always preceded by the extraction of the lime-salts.

7. The fungi have not the power either to penetrate or to decalcify sound dentine, so that the infection of a perfectly sound tooth by a carious one seems to be excluded.

8. We may accordingly look upon caries of the teeth as consisting of three stages: (1) decalcification; (2) infection and devitalization of the decalcified dentine; (3) putrefaction of the devitalized dentine; though it would not be easy to say just where one stage ceases and the other begins.

9. I have in a number of cases been able to establish the participation of the fungus *saccharomyces mycoderma* (?) in the carious process.—MILLER, *Dental Cosmos*.

RARE CAUSE (?) OF DEATH.

The *Independent Practitioner* says that "Mr. William J. Thulman, a druggist of Buffalo, recently came to his death from a singular cause. While eating his dinner a large amalgam filling in one of his teeth became detached and was swallowed. He immediately expressed his apprehensions of trouble from it, but felt no special inconvenience for some days, when he began to experience pain in the abdominal region. The symptoms became aggravated, peritonitis ensued, and he finally died after much suffering. An autopsy was held by prominent physicians, when it was found that the irregularly shaped mass had lodged in one of the lower folds of the ilium, and had produced an ulcer which had eaten its way through the intestines, and finally caused his death."

One of the "prominent physicians" who was present at the autopsy says that neither an "irregularly shaped mass," or anything that looked like an amalgam filling was found, although diligent search was made. We are inclined to think that the conclusions in the case are not warranted by the facts.—*Dental News*.

CONDUCTORIAL.

SOCIETIES.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

This society will hold its fifteenth annual meeting at Albany the second Wednesday (9th) of May. The list of papers is already a long one, but will be materially added to before the issue of the regular call.

The Board of Censors will meet in Geological Hall, same city, May 8th, and pass upon the qualifications of such dentists and dental students as present themselves for examination and are eligible as candidates for the diploma of the society and the decree of "M.D.S." The board wishes it distinctly understood that no examinations will be held during the sessions of the society. The prospective M.D.S. will therefore present himself May 8th, or wait until next year.

DISTRICT SOCIETIES.

FIFTH.—This society will hold its fifteenth annual meeting at the Butterfield House, Utica, April 10th and 11th. The call suggests *business*.

SEVENTH.—Rochester is the place and April 24th and 25th the time of meeting of this society. The call is in preparation.

EIGHTH.—April 17th is the time set for the meeting of this society. It will meet in Buffalo, as usual.

AN EDITOR WITHDRAWS.

Dr. James B. Hodgkin has withdrawn from the editorial management of the *American Journal of Dental Science*. Back numbers furnish abundant proof that "H" did his share of the work, always boldly and generally well.

TOBACCO.

As dental journals seem to be devoting considerable space just now to the discussion of the "weed," we would suggest to those who are studying the matter that they include in their reading Dr. Frank French's article, "Is Tobacco an Anti-septic?" which appeared in the *ODONTOGRAPHIC JOURNAL* for July, 1882, and since that time in several of our exchanges.

ANOTHER DENTAL JOURNAL.

The only new comer this year, so far as heard from by us, is the *Dental Practitioner*, a double-column, sixteen-page monthly, edited by Dr. Chas. E. Pike, and published by Gideon Sibley, Philadelphia. Among the contributors we notice the familiar names of Profs. Kingsbury and Pierce, and Dr. Head. The matter is good, but the paper poor—an error perhaps on the part of the publisher, but one that ought not to occur again.

SOME HOGS.

Last winter Prof. Joseph Leidy, of Philadelphia, purchased at Ward's natural science establishment in this city, the "lower jaw of a boar whose canines (tusks) had grown uninterruptedly until they had described an entire circle, completely crossing both rami of the jaw, and tearing away, with great disturbance to the alveoles, two of the molars on each side." A similar specimen has just been shipped to Mr. J. Z. Davis, of San Francisco.

PELLETS.

Baltimore has had three deaths from chloroform since last October.

The *Dental Register* began with its January number to use A 1 paper.

An exchange says: To clean cotton-wound broaches, dip them in sulphuric acid.

Items of Interest is the latest dental periodical to take on book form. It looks much better.

The eyes, ears, and teeth of the pupils of the Paris schools are to be inspected by order of the Municipal Council. Now for statistics.

Since our friend Barrett, and his associate, Dr. Hunt, took hold of the *Independent Practitioner*, it has undergone marked improvement in every particular.

The *Medical Record* has been greatly enlarged, the form changed, and larger type introduced. It is one of the best of medical journals, and at five dollars a year the cheapest.

Exchangers and others having business with the professional department of the ODONTOGRAPHIC JOURNAL are again reminded of the fact that our address is 20 West Main St.

For a few good points in the management of the new electric motor, the purchaser is referred to Dr. S. M. Prothro's article on that subject in the *Southern Dental Journal*.

Much of the contents of the *Herald of Dentistry* for January might be very appropriately headed "Rough on Rats." What the editor says is enough to make some men feel bad Oliver. A fan, please.

It appears to us that the *Dental Headlight* is rather late in publishing Prof. J. H. McQuillan's "Should Five Years Practice." etc. If we remember correctly it first appeared in the *Dental Miscellany* several years before its author's death.

That London dentist who "uses a small incandescent carbon lamp to illuminate the cavity of the mouth." is getting a vast amount of newspaper advertising for nothing. The dear public calls him great, but has yet to learn "who's his name."

The *Medical Record* advocates "the protection of college students from venereal diseases." It says: "The history of the case generally is that these young men go off on a 'frolic' to some neighboring place, get to drinking, and end their exuberance in some cheap brothel." The word "cheap" is suggestive. What simpler than to increase the tariff. It is only another phase of the coming question in politics—free trade or protection.

It was left for Dr. Lester Curtis to teach some of the controversially-inclined contributors to the dental press how to discuss scientific questions from a scientific rather than a personal standpoint, and he did it well in the February number of the *New England Journal of Dentistry*. The provocation to personality was certainly great, and to men possessing less of the "scientific spirit" the temptation to meet it irresistible. We congratulate him, also the dental profession.

At a recent monthly meeting of that lively local affair, the Rochester Dental Club, Dr. W. C. Barrett delivered, by special request, a lecture on "Causes of Dental Decay." It was fully illustrated by blackboard drawings, colored charts, and beautifully prepared and mounted sections of teeth—some of them by Miller, of Berlin. The lecture was off-hand and from a single page of notes. The club's "go on" every

time the lecturer ventured to suggest that he had arrived at a good stopping place, kept him at his work until he had been pumped dry, when he was let go. Richard was himself again before he was somebody else that evening. Doctor, "There's a cry from Macedonia," and the executive committee is again looking towards Buffalo.

Scientific and Literary Gossip has the following: "The Clarendon Press are soon to issue a series of translations of important biological papers under the editorship of Dr. Michael Foster, Dr. Pye-Smith, and Dr. Burden-Sanderson. The papers already announced are 'The Physiology of the Process of Secretion,' by Professor Heidenhain; 'The Function of the Brain,' by Dr. Goltz, and 'The Structure and Physiology of the Elementary Contractile Tissues,' by Professor Engelmann." A translation of one of Engelmann's monographs is concluded in this issue. We have no doubt the gentleman who did the work would be pleased to furnish the *Clarendon Press* people with a copy of his translation, if it is their purpose to include this in their list.

DIED.

At Lancaster, Pa., January 1st, 1883, of cancer of the colon, MARSHALL H. WEBB, D. D. S., in the 39th year of his age.

At Geneva, N. Y., January —, 1883, WILLIAM FIERO EDINGTON, M.D., D.D.S., in his 57th year.

MICROSCOPICAL.

Dr. J. J. Woodward, major and surgeon, U. S. A., is still quite ill. His leave of absence has been extended six months.

From this time on, Dr. C. O. Whitman is to have charge of the department of microscopy in the *American Naturalist*, vice Dr. R. H. Ward, of Troy, N. Y.

At the February meeting of the section of microscopy (R. A. S.), Mr. L. R. Sexton exhibited a new quarter-inch dry objective made by Gundlach. Its leading features were: 1st, great working distance, making it valuable for work over fluids; 2d, tapering front, permitting the passage of an abundance of light in the study of opaque objects; and 3d, a pair of adapters, one of which made it a desirable accessory to those who use a binocular.

It may do for Carl Heitzman and Lester Curtis to discuss certain points in histology; but it will not do for any man who has yet spoken on the questions at issue to attempt to lecture Lester Curtis on optics and mathematics as applied to the microscope and microscopical research. As one who knows his tools, what they should do, what they can be made to do, and the limits of their applicability, his name is too near the top of that very short list that includes the names of Woodward, Tuttle, Smith, Blackham, Moore, and a few others.

The only reasonable conclusion one can possibly arrive at in regard to the *Medical Record's* reviewer of Carl Heitzman's "Microscopic Morphology" is that at some past time, and probably in a New York society, the reviewer was so heavily sat upon by the reviewed that only recently has he been able to catch his breath long enough to squeal. It was a little squeal to be sure, but nevertheless a squeal.

SECTION CUTTING—A POINT.

In the course of an abstract of Selvatico's method of investigating the embryonic development of the Bumbycidæ, occurs the following:

"Previous to cutting sections the egg should be placed in absolute alcohol for half an hour, and then for a few moments in oil of clove or bergamot. Dry and imbed in a mixture of spermaceti (4 parts) and cacao butter (1 part) [the editor of *Science and Literary Gossip* has found either paraffine and vaseline fully equal to anything else for imbedding, and in such case the razor needs only to be flooded with alcohol]. The knife should be moistened with olive oil and each section washed with a mixture of four parts oil of turpentine and one of creosote to dissolve the imbedding substance surrounding the section."

Microscopical students, in no matter what department, will save themselves a deal of trouble if, before imbedding the thing to be cut, they dip it for a moment or two in a thick solution of gum arabic. As fast as cut the sections should be placed in a dish of clean water, where a few minutes will serve to re-dissolve the gum and free the sections completely of the imbedding material. We believe Dr. G. V. Black was the first to publish this method of getting around what had hitherto proved a great annoyance.

A NEW BINOCULAR.

The Bausch & Lomb Optical Company, of this city, have just completed a binocular of the well-known "Investigator" pattern, which, in addition to being as nearly perfect in other respects as possible, presents improvements in the construction and adaptation of the prism, and in the nose-piece in which the prism is fixed, that deserve attention.

In the absence of cuts of this part of the instrument, which we hope to be able to produce in our next issue, those of our readers interested in this form of microscope must be content with a brief outline of the leading features of the new arrangement. These are:

1st. A very large prism with perfectly plain surfaces, cemented upon a glass disk.

2d. As this combined prism and disk is fixed by the maker, it remains in place regardless of the whim of or want of skill in the observer.

3d. The mounting of this combination is a brass nose-piece, which slides into the tube and is fastened by a new form of bayonet catch, a novel feature in itself.

4th. The monocular nose-piece is separate and is fastened in the tube in the same manner.

5th. The effect with the prism in place is quite as good in this instrument as it is in the old forms when the prism is withdrawn, as it permits the passage of all light possible in objectives with the society screw.

6th. While a little more time is consumed in changing from monocular to binocular and back again, than is the case in the old form, the loss is fully compensated for by the absolute accuracy of the new, which cannot get out of place.

7th. As low powers only are used in binocular instruments, a given objective may be kept in the binocular nose-piece and the higher power in the monocular, an arrangement almost as convenient as in the well known double nose-piece.

8th. The bayonet catch above mentioned may be applied, and probably will be in the near future, to objectives as a substitute for the society screw. The fit is as good, and the time saved in changing objectives great.

THE ODONTOGRAPHIC JOURNAL.

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HAND EXCAVATORS.*

BY CHAS. T. HOWARD, D. D. S., ROCHESTER, N. Y.

Dental literature devotes but little, if any, space to the scientific consideration of Hand Excavators in their relation to utility and economy. They have in these respects remained outside the field of observation to nearly all.

A great many patterns and entire sets have been brought to the notice of the profession, but generally they come with the plea, this or that instrument cuts better or reaches the part more easily than any heretofore known.

This gives sufficient reason for their existence and adoption, but it does not add one valuable fact to the store of our knowledge.

I have been told that Dr. Jno. B. Rich, of New York, has Hand Excavators reduced to what he calls a "mathematical nicety." Of this I know nothing save as a report, and regret that it has not been given

* Quite a little of this paper is taken from the prize thesis, "The Form and Actions of Hand Excavators," of the Dental Department of the University of Pennsylvania, for the session of 1880-81, by the author, though not in the exact words. It also corrects what has since been found to be mistakes in that.

to the profession. I do not wish to follow the example set, but will make the results of my study easy of access where they can be corroborated or proven wrong. If they are not correct and have no value others may see it and do better.

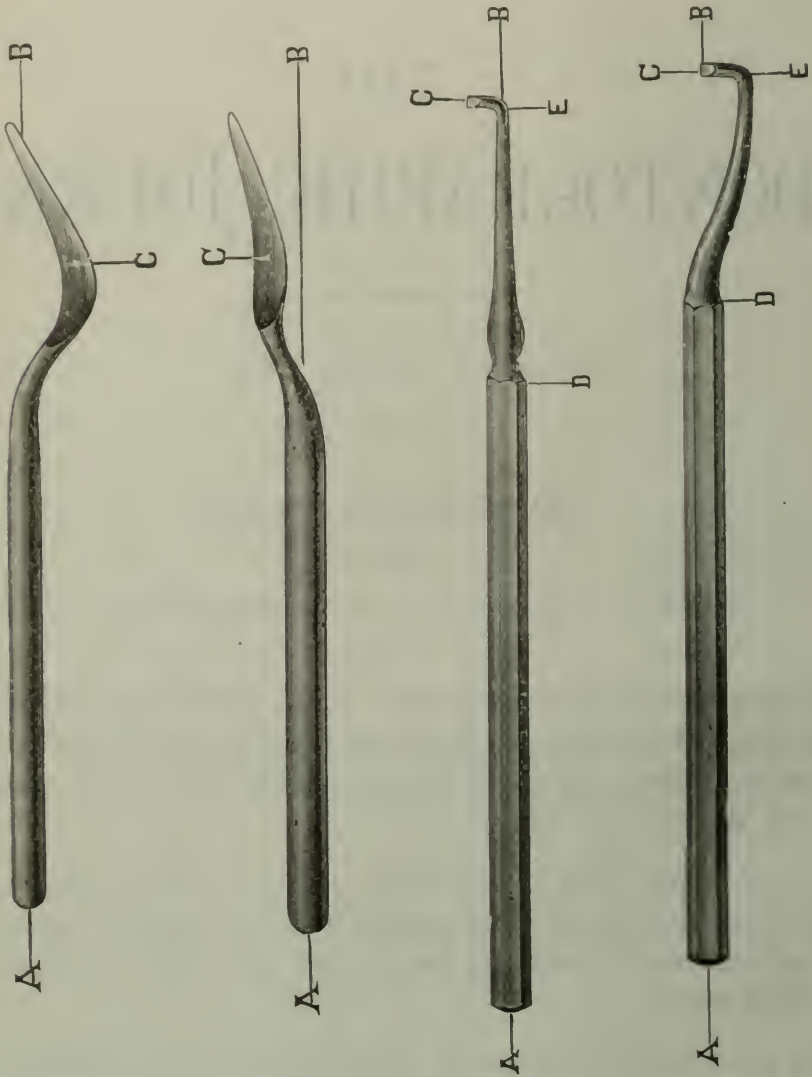


FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

It is not from a desire to build railroads in the mouth, or turn the teeth into haystacks, or make a restaurant of the oral-cavity, that dental Hand Excavators are in some respects compared with the shovel, the hay-fork and the spoon. But these are common things, which all people profess to understand, and contain some practical points that in them are readily explained.

The shovel, Fig. 1, is highly philosophical. When it is grasped by the handle it "hangs well," a phrase indicating that it keeps right side up of its own accord. In other words, it has no tendency to turn on the long-axis of the handle, A-B. This is because the point or center of gravity, c, of the shovel's pan, is directly beneath the line of the long-axis of the handle (A-B.) when extended to and beyond the pan as in Fig. 1.

Consider for a moment the shovel formed on a different plan. Figure 2 is a shovel so formed that the center of gravity, c., of the pan is directly above the extended line of the long-axis of the handle, A-B. Such a shovel would instantly turn on the long-axis of its handle, unless force be exerted to prevent it. Its adoption would make unskilled labor five dollars per day. The chief qualification being strong fingers.

If one of the common Hand Excavators be placed in the same position as the shovel, that is, horizontally (Fig. 3), any one can readily see how a product of a profession (Fig. 3) compares with an offspring of the imagination (Fig. 2). The cutting edge (c. Fig. 3) takes the place of the center of gravity (c. Fig. 2).

The shovel has features not common to the Excavator that should be considered.

The absence of a uniform position of the center of gravity of the pan, or rather pan and load. If the pan in Fig. 1 be filled with any solid material the center of gravity to be noted is one common to pan and load. This common center of gravity will be above that of the pan and, if the load is sufficiently large, it will be above the extended line of the long-axis of the handle. When the latter is the case we have a condition of unstable equilibrium, as in Fig. 2, and the tendency will be for the shovel to turn over on the slightest disturbance. But the handle of the shovel has at its extremity a flat part, well adapted to the hand, where leverage can be had to counteract this tendency. The spoon has the same general form as the shovel. The hay-fork conforms to the shovel, with the exception that it has no flat part to the handle. The experienced farm laborer meets this discrepancy by inserting the fork in the hay to be moved, in such a manner that it suspends from the fork instead of resting upon it. He thereby brings the common center of gravity of the load farther beneath the line of the long-axis of the handle than it is in the fork alone.

The Hand Excavator belongs, in some respect, to this class of implements. But it varies from them in that its actions do not have the force of gravitation as a ruling factor. It is worked with the long-axis of the handle in any direction, from horizontal to vertical, and does work, from direct cutting to scraping. Although the Hand Excavator is not used as the shovel, and does not depend for its efficiency on the laws of gravitation, yet, by a very few changes in terms, the shovel will be recognized as an easy step to the study of the Excavator.

Instead of applying center of gravity to the cutting edge let it be point of resistance. When speaking of a lever, point of resistance will be synonymous with point of weight.

We might chase an Excavator to the end of the laws of gravitation and not obtain the requisites for finding its economic value. We could demonstrate that if used as the shovel, the fork, or the spoon it contained a grave mistake, and indeed if used as an Excavator. But to what extent mathematically that mistake injures its working qualities must be shown by the proper application of the laws of the lever.

An Excavator with its cutting-edge back of or below the extended line of the long-axis of the handle would be suitable only for direct cutting as the shovel is for lifting. The least effort at an angle from straight cutting, such as scraping, would instantly show a tendency to turn on the long-axis of the handle. If the cutting-edge or point of resistance is placed upon the line of the long-axis of the handle, what will be the results?

Figure 4 represents an instrument formed after that manner. No amount of force, proper for the instrument, acting upon the cutting-edge will turn it. Therefore, whether cutting direct or scraping, an Excavator with the form shown in Fig. 4, will have no appreciable tendency to turn, and turning or rotating it will accomplish nothing unless the angle at c is fixed by resting upon some adjacent solid. Does it result in any good? It makes all excavations of the same class, having this form, work alike, except what variation is caused by the difference in the extent and shape of the cutting-edge. It does away with all the forces necessary, in the common form Excavator, to prevent turning. It reduces the directions from which force is required in the common Excavator by over one-half. It does away with the motion through which the greatest loss of power occurs.

Is there any loss of power or force not utilized that is exerted on a Hand Excavator? This brings me to the consideration of the Hand Excavator under the laws of the lever.

The Hand Excavator is a combination of levers. Though a simple piece of steel, the application to it of the laws by which its working is governed is too complex to be followed in all its modifications and bearings by this paper.

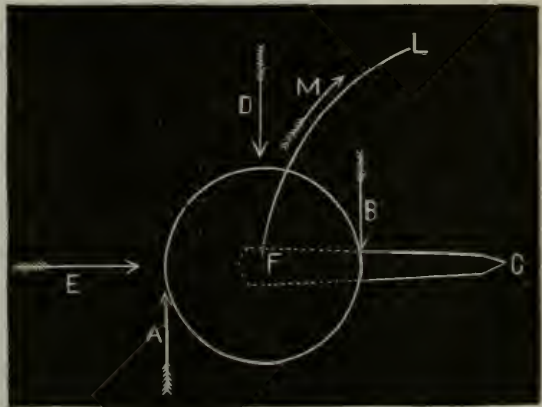
The handle A-D. and the shank D-E. (Fig. 3) form one lever: the lever for side motion. The point of weight is where a line, drawn from the cutting-edge, would meet the extended line of the long-axis of the handle perpendicularly.

The handle must not only play the part of power, but also act as fulcrum. The loss of power through this lever, in the Excavator taken for example, will be at least two-thirds of that exerted by the hand.

Turn now to the levers of rotation; the motion that should be done away with entirely, or used in a different manner. This motion is quite complex and very surprising in result. It has not attracted notice. It appears a small and simple thing. It is produced by the action of two levers.

Fig. 5 represents a common excavator viewed from the end of the handle, which is round. Their points of power, or points where force is applied, are on opposite sides of the handle. The two forces are represented by the arrows A. and B. (Fig. 5). They have a common fulcrum; the long axis of the handle (F. Fig. 5), and a common point of weight; the cutting edge (C. Fig. 5). Their power-arms are equal in length to a radius of the handle. They have a common weight-arm extending from the cutting-edge perpendicularly to the extended line of the long-axis of the handle (C-F. Fig. 5).

FIG. 5.



The power-arms do not vary in length in any given set of instruments. The weight-arm (C-F. Fig. 5) has a special length for nearly

every instrument, and is the factor that causes the variation in force required to work different excavators of the same class, aside from that dependent upon the extent and shape of the cutting-edge. To determine to what extent, otherwise, the levers of rotation affect the working of the excavator, the above must be applied to one of real existence. The one taken for example is nearly the extreme length, and has measurements as follows: Diameter of handle, three sixteenths of an inch; length of shank (D-E., Fig. 3), two inches; perpendicular distance of the cutting-edge, from the extended line of the long-axis of the handle, six-sixteenths of an inch (C-F. Fig. 5). It is desired to produce the effect of one pound at the cutting-edge and use the motion of rotation.

One-half the diameter, or a radius of the handle, three-thirtyseconds of an inch, being the length of the power-arm and the perpendicular distance, the cutting-edge is from the line of the long-axis of the handle, or six-sixteenths of an inch, being the length of the weight-arm, the power necessary to move a weight of one pound by acting through this lever is found by the following (see Natural Philosophy): "The product of the length of the power-arm multiplied by the power must equal the product of the length of the weight-arm multiplied by the weight," or

$$\begin{array}{ccccccc} \text{P.} & \text{A.} & \text{W.} & \text{A.} & \text{W.} & & \text{P.} \\ \frac{3}{32} & : & \frac{6}{16} & :: & 1 & : & (?) \end{array}$$

This will give a result of four as the number of pounds of power necessary to move one pound of weight by either of these levers. This power is acting equally distributed on two levers making two forces of two pounds each (A. and B., Fig. 5). One of these levers, the one of which A. (Fig. 5) is the power, is of the first-class and bears upon its fulcrum (F., Fig. 5) with a pressure equal to the sum of the power (A., Fig. 5) and weight, or three pounds. The other lever is one of the second-class, and bears upon its fulcrum (F., Fig. 5) with a pressure equal to the difference between the power (B., Fig. 5) and weight, or one pound. These pressures oppose each other, and would cause the common fulcrum to move upon the arc F-L in the direction of the arrow M. about the cutting-edge C. (Fig. 5) with a power of two pounds.

This necessitates a third force (D., Fig. 5), one to support the fulcrum of the levers of rotation, which must be exerted through the lever of handle and shank with the effect of two pounds at its point of weight. The hand must, therefore, exert a force equal to six pounds,

merely, to counteract the tendency the long-axis of the handle has to describe a circle around the cutting-edge instead of the cutting-edge moving. Sufficient as the forces enumerated may appear they could accomplish nothing without an additional force (E., Fig. 5) to press the Excavator against the part operated upon. This must be exerted through the lever of handle and shank, and will require of the hand at least one pound. We thus have a total of eleven pounds resulting in one pound of actual weight.

This amount of power is necessary to effect the work of one pound by rotation, with the Excavator chosen for example. But all Excavators are not made to use by rotating. Yet as a general thing about the same amount of power is required to prevent rotation, and all the power thus used is a total loss.

It is not pleasant to be confronted with the fact that we waste ten-elevenths, or ninety and nine-tenths per cent. of the energy put in our operations through mechanical appliances. But this is a fact only when using excavators such as the one chosen for example. The loss decreases as the perpendicular distance the cutting-edge is from the extended line of the long-axis becomes less. When this distance becomes zero (Fig. 4) the common weight arm of the levers of rotation, considered in this paper, is destroyed; the levers no longer exist; and all the loss that can occur must be through the lever of handle and shank, unless a new lever of rotation is established by resting the angle E. (Fig. 4) on some adjacent solid. This new lever of rotation is quite to the operator's advantage; giving an increase of power by leverage.

The loss through the lever of handle and shank can be lessened by having a shorter shank. The cone-socket-handle excavators owe, perhaps, much of their success to this feature. Excavators with shanks one and three-fourths, instead of two and one-half, inches in length are now common. But with even these the operator often grasps the round, smooth, tapering shank because the handle is too far from his work. The proper measurement from the cutting-edge to the handle is one and one-fourth inch. Hand such an Excavator to a dentist and he will, when opportunity permits, grasp the handle at its extreme end and toward the cutting-edge. Combine this length of shank with the form shown in Fig. 4, in Excavators to reach the same parts as the example chosen, and from seventy to ninety per cent. of the force exerted on the instrument can be realized, instead of ten per cent. as in the common form. It will not change the working qualities of all excava-

tors alike. Those which are the poorest will be improved the most, and they, if no others, should be changed.

I have nothing to say against art being displayed on Hand Excavators when proper in character and place. But I do object to art when it destroys utility. The base of the shank needs no decorating; and as for the rings, ridges and creases placed upon it being of advantage to the operator nothing is more false. A regular and evenly roughened surface is always preferable. Besides there being no need of these rings, either from a point of beauty or usefulness, there is no room for them. Take, for instance, Dr. R. W. Varney's set of pluggers. In them true handle exists where in most others nothing but rings are found. They are plain, with transition from handle to shank simple as possible. What this adds to these pluggers it will add to every Excavator on which it is used.

CHRONIC INFLAMMATION OF THE GUMS.

BY F. E. HOWARD, M. D. S., GENESEO, N. Y.

The subject I shall offer for your consideration is that form of inflammation generally recognized as due to local irritation, and which is aggravated by hereditary transmission. The subject of inflammation of the gums, acute and chronic, might be divided into a number of classifications, and each furnish a theme of sufficient importance to engage the attention of the Profession. A thorough digest of the subject in all of these different forms is not the object of this paper. I will only touch upon that condition usually presented to the dentist, where local irritation aggravated by hereditary transmission is the cause, and a course of treatment that I have pursued with success.

Tartar is often the cause of the difficulty in the first form of inflammation of which I shall speak. After the inflammatory condition has existed for a long time, the soft tissues have become partly detached from the necks of the teeth, and recession of the gums has taken place, leaving pockets between the teeth for the retention of food and secretions, we find this state of things augmenting

the condition materially. The calculus deposit is first established about the posterior and lingual surfaces of the inferior incisors and the buccal surfaces of the superior molars. At these points are found the outlets of the salivary secretion, from which we infer that the principal deposit is from the salivary glands, augmented probably by the mucus secretions. From these points of deposit, the inflammation extends until every tooth in the mouth sometimes becomes involved.

I believe it is conceded that in the aggravated stages, the salivary secretions are sluggish; the inorganic material not being held in solution until fairly ejected into the mouth becomes deposited about these surfaces, the rough, and inviting places of the teeth. A nucleus once formed, aggregation goes on until serious secondary lesions result, greatly augmenting the trouble. Attachment being made and not disturbed by proper brushing, or an operation, the neck of the entire organ is eventually circumscribed, the deposit working in the direction of the root and crown of the tooth. This condition once established the gums soon lose their integrity, the roughened surfaces induce inflammation, which is accompanied by suppuration, and a false abscess is established. This condition progressing, the alveolus is encroached upon, and as the result the exposed bone circumscribing the tooth becomes necrosed. This suppurative necrosed stage greatly augments the difficulty; the secretions are viscid, ropy, and gluey; the breath disgustingly offensive. This condition of the mouth, I believe, is sometimes the prime cause of general debility. For in this stage a general catarrhal condition is often manifested, and not a breath of pure air is taken into the lungs. When no bone or gum attachment is left, the final destruction of the organ is the result. A happy state of things for the unfortunate patient, for when the teeth are gone the debilitated system gets rest, which often results in building up the general health.

The other form of chronic inflammation of which I shall treat, is often due to hereditary transmission, and not so much from lack of attention on the part of the patient. This is a low form of chronic inflammation, invariably accompanied by suppuration and partial necrosis of the alveoli. This condition is usually manifested in middle life and old age, and is due largely to the low degree of vitality in the teeth. Being of a hard dense structure with these subjects at this period of life, they act as mechanical irritants to the vascular and sensitive tissues. This senile stage develops a lack of harmony, a want of sympathy in the parts. From hereditary transmission, a lack nutri-

tive element in the system at this time of life, together with the local irritation of slight deposits of tartar, and the density of the teeth, cause the breaking down of the tissues.

This form of chronic inflammation and recession of the gums, has been sometimes called "Riggs' disease." But I do not find that Riggs has done more to enlighten the profession on this subject than many others, neither has he projected a method of treatment in advance of other members of the profession.

I am much inclined to think that Bacteria is one of the active agents in this destructive work of chronic inflammation of the gums. When once the inflammatory condition is established, it really looks as though a fine field for their operation was presented. The fetid breath, the character of the pus oozing from the gums, would indicate that this was a favorable play-ground for them. This condition of the mouth would really offer them a cosy place to work. When once a foothold is established and they are not overcome, why should they not work to the very end of the tooth and assist in uprooting it from the foundation? Is not this often the case? and do we not wonder at the active element in certain conditions in this work that baffles our skill? When once thoroughly established and carried beyond a certain stage, we must confess we are unable to control it.

TREATMENT.

The treatment of these pathological conditions consists of the thorough removal of all foreign substances, "tartar" being one of the exciting causes of the difficulty in the aggravated stages. This is accomplished by the use of scalers, chisels, etc., either by a pull or push cut. I am inclined to think that the opinion prevails among many that the instrument must be passed down below the deposit, and by a pull cut detached and removed. This is not at all necessary. Often an instrument in the form of a chisel will pass much further down, upon the roots of the teeth, and detach the deposit more effectually and with less pain to the patient. When once the connection is severed by the deposit being detached from the root, it is not necessary for its complete removal with the instrument, for nature will take care of any detached pieces; they will soon be expelled from the pocket, no matter what the situation may have been. When this has been thoroughly accomplished, which is seldom done at the first sitting when the case is an aggravated one, it is next necessary to polish all surfaces that have

been encrusted with the tartar—under the gum and upon the crowns. This is best effected upon the crown surfaces with a stick of wedge-shaped orange wood loaded with pumice and silex. The roots under the gum surfaces are best polished with such shaped instruments as in general resemble scalers and chisels in form, and dull like burnishers. With such instruments the roots are left in a fairly smooth condition, which favors less the secondary deposit.

When the inflammatory condition has progressed so far as to involve the alveoli, by causing a suppurative and necrosed condition to be established, a still more complicated operation may be pursued to advantage. The margin of the necrosed alveoli may be removed with instruments that will pass around the root, cutting away the process circumscribing the tooth. This is easily accomplished with delicate chisels that will pass under the gum to the edges of the process. By passing this around the root of the tooth the desired portion is fairly taken off, leaving the parts in a condition to re-establish healthy granulations.

The operation should be followed by proper medication, which should consist of the application of such remedies as in the judgment of the operator will meet the requirements of the case. Of these, for use under the gums, none perhaps is better for the first application than aromatic sulphuric acid, full strength and diluted, to be followed with chloride of zinc in the proportion of 1 to 2 of water, and weaker as the case progresses.

It is a disputed point as to whether the acid dissolves any remaining portion of the calculus. It however dissolves the inorganic matter from the diseased alveolus where that is too weak to resist its action, and stimulating that less weak, it not acting upon healthy tissue by dissolving out the lime salts, but stimulating the parts to re-establish new granulations. It is therefore not absolutely necessary to excise the necrosed portion of the alveolus, as the acid will do the work; but there is no objection, and possibly some advantages in this method of cutting away, for the work is facilitated, and advancement made by hastening the cure. Following this, at subsequent sittings, inject carefully with a hypodermic syringe, chloride of zinc in the proportion of 1 to 2 of water, sufficient to bathe all the parts where it is necessary to get a new attachment of the gum to the teeth. The coagulated substance from the juices of the tissues is obtained, and a new

attachment in time will be secured. Sometimes when the periosteum is entirely lost, there is a mechanical adaptation that secures firmness. This is the condition of the parts with a "re-planted" tooth retained; having been entirely stripped of its periosteum, it is sustained in position by this means. Tannin should at times be sprinkled upon the gums; it is a powerful astringent, and reduces the chronic inflammation rapidly. When the roots are stripped of the encrusting tarter, they are sometimes sensitive to thermal changes, acids, sweets, etc. The tannin having a strong affinity for the tooth element, unites with it and obtunds the sensitive condition to a great degree.

Give directions as to the manner in which the teeth should be brushed. A rotary motion of the brush should be given, from the gums to the grinding surface, as well as crosswise. This will more effectually cleanse the teeth of foreign substances, largely prevent tartar from accumulating, and overcome the tendency of the gums to recede. A proper tooth powder, and an astringent wash should be used as a stimulant and tonic for the gums and a polisher for the teeth.

Facial neuralgia is often associated with this complication of the teeth. The dentist is sometimes consulted in regard to the condition of the teeth. No cavities of decay being found, the patient is dismissed with the assurance that the teeth are not the cause of the difficulty. Chronic periosteal inflammation is often the cause of neuralgic trouble, and it is amendable to cure with proper treatment.

My experience is that no operation performed by the dentist in the mouth is more appreciated by the patient after they have seen the results of the successful treatment of these cases.

DEFECTIVE DEVELOPMENT.

Dr. W. B. Atkinson recently brought before the Philadelphia County Medical Society a man, aged 40 years, who presented the following peculiarities. He has never had teeth, nor any distinct growth of hair on the scalp, except the downy hairs such as are seen in early infancy. He is also destitute of the sense of smell, and almost of that of taste. His skin appears to be unprovided with sweat-glands, as he never perspires, and when working actively he is obliged to wet his

clothes in order to moderate the body heat. He can sleep in these wet clothes, in a damp cellar, without catching cold. His jaws present the appearance seen in persons who have lost all their teeth. Hair is present in the axillary and pubic regions, but the downy hair which is usually seen over the skin at large is wanting, except on the scalp. His maternal grandmother and uncle were similarly defective, and the present patient was among the younger of twenty-one children. He was a man of very good health, having never been seriously sick, and, although not able to chew his food in the ordinary manner, he never suffered from dyspepsia. The secretion of urine was unusually abundant. He was married, and had eight children, among whom were two girls, both of whom lacked a number of teeth.—*Philadelphia Medical Times.*

WHY ARE WE RIGHT-HANDED?

The reader has no doubt often wondered why people almost invariably use their hand in preference to the left. Is it not remarkable that, through all time and in all lands, man has been a right-handed being? The individual exceptions only prove the rule. What is the reason? It can not be simply imitation or heredity, for in those children who are disposed to use the left hand these influences will not avail in changing the inclination, even, in many instances, when supplemented by persuasion or force.

In my belief, there is a physical cause for this uniform habit—a cause that is demonstrable by anatomical and physiological facts. These, for the sake of brevity, are expressed in the following statements:

1. The brain (cerebrum) is divided into two hemispheres.
2. The nerve-force and nerve-fibres which produce muscular action on the one side of the body have their origin in the opposite hemisphere of the brain.
3. The left hemisphere, from the earliest period, is larger and heavier than its counterpart, and the convolutions of gray matter—the reservoirs of nervous energy—are more numerous on this side than on the right.



- 1, 2, 3. aorta.
1. Ascending part of aorta.
2. Transverse part and arch of aorta.
3. Descending part of aorta.
4. Innominate artery.
5. Right subclavian artery.
6. Right common carotid artery.
7. Left common carotid artery.
8. Left subclavian artery.

4. This superior development of the left hemisphere as to weight, size, and richness of convolutions, may be attributed to a peculiar arrangement of the blood-vessels, by means of which a greater blood-supply is distributed to the brain substance of this side.

5. The arrangement of the blood-vessels to which I refer is the manner of origin of the right and left common carotid arteries. The carotid artery is a branch of the innominate artery on the right side, while it springs direct from the aorta on the left.

This directness of communication, in addition to a larger caliber of the left carotid, gives the left hemisphere a decided advantage in the race of development.

To reverse these statements we would have: as a consequence of the greater capacity of the left carotid the left hemisphere of the brain has a greater blood-supply; as a consequence, there is a greater development of the left hemisphere as to weight, bulk, and number of convolutions; as a consequence, when there is need of muscular action, the child naturally uses those muscles which possess the more powerful nerve-supply, for muscles are only strong in proportion to their nerve-supply; as a consequence, the nervous energy is dispatched, in those cases where there can be a choice, from the left hemisphere; as a consequence, the right hand and right leg will be the more likely used, since this side of the body is innervated by the left hemisphere. Thus, predisposition primarily, and use afterward, influencing and strengthening each other, fix upon us a habit almost unchangeable—how firmly, let those who ever attempted to break the habit in a left-handed boy testify.

But this leads to another question. Why are there left-handed people? Before we answer this question, we will again look at the diagram. We have seen that, as the aorta rises from the heart, it

arches from right to left, and the first large artery it gives off is the innominate, which in turn is divided into the right common carotid and right subclavian arteries. Farther on, we find the left common carotid and the left subclavian arteries arising separately from the aorta. Now, in making their dissections, anatomists have found that in a certain proportion of their subjects the aorta arches from left to right, in which cases the innominate is on the left side, and the common carotid and subclavian separate on the right. This arrangement would favor the growth of the right hemisphere, and would predispose to the use of the left hand.

Unfortunately, there have been no *post-mortem* examinations made for the purpose of observing whether this arrangement of blood-vessels and the use of the left hand really do occur in the same individual, nor is it necessary that it should be found in every case, for there are other anomalies in vessel-branching which would favor the growth of the right hemisphere. Apropos of speaking of the preponderance of the right over the left hemisphere, it might not be amiss to mention here that recent investigations have shown this condition of the brain to be characteristic of certain forms of insanity. This does not prove, however, that because a person is left-handed he is necessarily in any degree insane, as some *dexterous* reader may superciliously infer. Now, if the reason of our choice of a hand is due to an organic cause, how unwise is it to fight against nature, unless we commence at the beginning, and trust that habit will overcome the predisposition to the use of the left hand! Undertaken later, the result is often to spoil the skill of the left hand, without training the right to do its work as well. In conclusion, from what we have seen above, in answer to the question, Why are we right-handed? it might be said, because we are left-headed.—CAHALL, *Popular Scientific Monthly*.

DEATH UNDER CHLOROFORM.

A lady, well known in private circles as an accomplished amateur musician, who frequently performed in public for charitable objects, died at Inverness, on the 10th ult., whilst under the influence of chloroform. The anæsthetic was administered in order that three decayed teeth might be painlessly extracted. At the patient's own request, chloroform was administered in the usual manner, and two teeth in the

lower jaw were successfully extracted. The last tooth to be removed was an upper molar ; in the process of its extraction, the lady showed signs of returning consciousness by lifting up her hands ; but she immediately afterwards expired, apparently from syncope. The deceased, on several previous occasions, had had teeth removed whilst under the influence of chloroform.—*British Medical Journal.*

THE ETIOLOGY OF PERNICIOUS ANÆMIA.

Frankenhäuser has made the rather startling discovery that pernicious anæmia is caused by bad teeth. He claims to have found in the blood of pregnant women suffering from pernicious anæmia little, round, very active bodies, about one-tenth the diameter of a blood-corpuscle, and furnished with a scarcely discernible tail. Besides these there were other objects, longer than the preceding, without tails and more sluggish, which seemed to be in a state of transition into double-celled bodies. The smaller bodies were exceedingly active, resembling spermatozoa in their rapid movements. As he never found these micrococci in the blood of pregnant women not the subjects of pernicious anæmia, it seemed to the author most reasonable to conclude that there was some connection between them and the disease. The next question to determine was in what way these little strangers found entrance into the blood. The most promising field for investigation was now the liver, an organ which he had for a long time regarded, on clinical grounds, as the disease centre. And the investigator was not disappointed, for he found in the liver-cells, near the left lobe, in severe cases of the disease, a great number of multicelled filaments. These, he thought probable, had worked their way from the intestine up through the ductus choledochus and biliary ducts into the liver-cells. Thence they forced an entrance into the capillaries in such numbers as to stop the circulation, or at least to offer a very great impediment to it.

Here, we claim, they change their form and get a tail and then pass out into the general circulation. We see in their presence in the liver a ready explanation of the icterus which occurs in pernicious anæmia. As far as the investigator's researches have yet gone they have led him to the belief that the origin of these organisms is to be found in a fungus growing in carious teeth. All the patients whom he examined had dental caries and a fetid breath. Hence he concluded that the frequency

of pernicious anæmia in pregnant women was to be explained by the fact that women in this condition often had bad teeth. And further, since almost the entire population of Zurich is afflicted with unsound teeth, an explanation of the unparalleled frequency of the disease under question in that city is afforded. The dependence of fatty heart upon the same conditions appears to Frankenhauser, to be not only possible, but even probable. If this most promising field of investigation be cultivated with sufficient energy and imagination, it may yet come to pass that the dentist, with his ounce of prevention, will take rank as the greatest benefactor of the human race.—*Medical Record.*

AN UNUSUAL SURGICAL CASE.

Through the kindness of Dr. Mears we recently had the opportunity of seeing the result of a rare if not unique surgical operation. The case was that of a young lady, 20 years of age, who had been accidentally shot, when only two years old, by a playfellow. The charge consisted of small bird-shot, a few of which were still present and could be felt underneath the skin at the side of the neck ; the gun was within a few feet of her face when discharged, the mass of the contents passing directly through the left side of the face, the direction being from before backward and outward. The greater part of the left cheek was torn away, including the zygoma, the malar bone, and part of the superior maxilla. Profuse bleeding followed, and a physician who was called in declined doing anything for the little patient, as, he said, she was sure to die. Her parents being intelligent people, cleaned the wound and applied pressure, with the result, not only of stopping the bleeding, but also of healing the wound, after a number of pieces of bone had been discharged. The result, however, as regards the functions of the jaw, was not very good ; ankylosis followed, and the jaws were bound together by a firm band of fibrous structure. For eighteen years she had been unable to eat food which required mastication ; the teeth were prevented from developing, except a few which grew to one side. The front teeth were rudimentary, and she stated that she had worn them away trying to push food into her mouth. Her voice was good, and she had just finished a collegiate course, to fit her for teaching. She sought relief from the ankylosis, in the hope that the defective denture might be remedied in appearance, at least, by a double set of artificial teeth.

Dr. Mears found that the jaws were united on the left side with a firm band, fibrous or osseous, and that only a slight lateral movement existed at the articulation ; there was also defective development of the bones of the left side of the face. The cicatrix on the cheek had contracted so as to draw away the lower lid and produce extensive ectropion ; and the cornea had become opaque, either from the original injury or from exposure, so that the function of this eye was destroyed. The operation was completed at one sitting. A plastic operation was performed, to relieve the ectropion ; and, in order to prevent unnecessary disfigurement, instead of making the usual line of incision to resect the jaw bone, the knife was then carried through the cicatrix directly outward toward the lobe of the ear ; the ascending ramus of the jaw bone was then divided with the saw, just below the coronoid process, and the portion of the bone above this was removed from its socket. A chain saw was then introduced into the mouth, and the vicious band of union was divided, giving at once considerable motion to the jaw. A number of defective teeth roots and stumps were removed, twenty-two in all ; six teeth in front and on the right side were found to be good, and were allowed to remain. When seen, six weeks after the operation, the wound had healed, except a small superficial spot. The ectropion had been corrected ; she was able to completely cover the eye with the lids. The jaw could be opened over an inch, and admitted lateral motion for chewing. She is now being fitted with artificial teeth ; her appearance has been immensely improved. Before the operation she was obliged to constantly wear a black patch over her eye, which is no longer necessary ; a veil is worn when she is out on the street, which sufficiently hides the cicatrix.—*College and Clinical Record.*

DENTAL FORMATION IN THE NASAL CAVITY.

A gentleman had for some time experienced a slight obstruction in one nostril. Examination revealed the presence of a hard, roundish, movable body, which was attached to the floor of the nostril about one inch from the anterior opening. It was removed by the snare, and was found to be a perfectly formed canine tooth, a little over an inch in length. The anterior portion was covered with enamel, and its little root presented a layer of cartilage. There was no bony alveola. The patient had all his teeth.—*Deutsche Med. Wochenschrift.*

THE PARABLE OF THE CHAPEL.

1. For the kingdom of justice is likened unto a man that is a janitor, which went out early in the morning to ring the gong for his chapel.

2. And when he had tapped the gong with a loud sound, many of the students who were there, went into his chapel.

3. And he went about the halls and saw others standing idle in the reading-room ;

4. And he said unto them, go ye also into the chapel, and whatsoever is right shall be given unto you. And they gave him the mean grin.

5. And he went about for the second and third time and did likewise.

6. And about the eleventh minute he went out and found them still standing idle and said, Why stand ye idle all the hour.

7. And they said unto him, Is the Amen at hand ? And he answered and said, verily it is ; and forthwith they did glide stealthily into the chapel.

8. So when the recitations came the Prex. of the chapel, said unto his stewards, call the roll and give them their marks from the first to the last.

9. And when they came to them that had slipped in about the eleventh minute, they answered every one—"twice."

10. And when the first were called they supposed they would receive more, and they received every man twice.

11. And when they had received it they murmured against the good man of the house,

12. Saying, these last have prayed but one minute and thou hast made them equal unto us, which have borne the burden and heat of the prayer and oration.

13. But he answered one of them and said, Friend, I do thee no wrong ; is it not a custom of all those to answer twice who have heard the Amen ?

14. Take that thine is and go thy way ; I will give unto this last even as unto thee.

15. For the last shall be first, and the first last.—*Rochester Campus.*

A SUGGESTION—JOURNALISTIC.

The journalistic interests of the dental profession of the country have assumed such an importance and magnitude, as to warrant associate and conjoined consideration on the part of those now immediately connected with and conducting its affairs.

In all great interests, it is generally conceded, that in union and co-operation there is strength. With this fact in mind, it is here suggested that there be held at Niagara Falls, at the time of the meeting of the American Dental Association, a meeting of all the editors of dental periodicals and papers in the country, with the view at least of social converse, and considering so far as may be practicable matters of general journalistic interest; and out of this perhaps might arise a permanent organization. Such a meeting would be pleasant and doubtless profitable. Brethren of the tripod, do you homologate? If so, will somebody name the day, place and hour?—*Dental Register*.

CHLOROFORM WATER.

This is prepared by mixing three parts of water with one of chloroform, shaking the mixture well, and letting it stand for some time. The excess of chloroform is then removed by decantation, or is drawn off with a syphon; the water thus obtained contains nine parts of chloroform to one hundred parts of water. This is a good solvent for chlorate of potash, bicarbonate of soda, salicylate of soda. Chloroform water, as thus obtained, is said to be the best preparation wherever the internal use of chloroform is indicated.

Chloroform water is very agreeable to the taste, and leaves in the mouth a sensation of coolness, lasting for a few minutes after the water is swallowed. This water is well adapted as a vehicle for medicines having a disagreeable taste, its own peculiar taste generally acting as a complete disguise. For its local action this preparation can be beneficially used in many affections of the mouth, gums, palate and pharynx. Its action on the stomach varies according to the circumstances under which it is taken. Taken with wine it increases its stimulant properties. It is efficient in combating digestive disturbances, acting as a local sedative as when in contact with the mucous surface of the mouth.
—*Exchange*.

ZINC VERSUS BABBITT METAL.

Thirty years ago a partner of mine, Dr. D. H. Goodno, after experimenting with all the metals ever used for dental dies, and finding nothing satisfactory, at last thought that "Babbitt metal," then but little known, might answer the purpose. He tried it, and found to his great relief, that it was just what he needed. We adopted it at once, and after having used it exclusively all these years, can say it is a perfect thing for the purpose. And why should it not be? It has all the requirements needed, viz.: non-shrinkage, hardness, toughness, smoothness, and melting at a low temperature. Now, while zinc is hard, its shrinkage is a serious objection. Type-metal does not shrink, but is too brittle.

But it is necessary that the Babbitt metal should be made from a correct formula. Much that is sold, while it answers the purpose for which it is generally used, viz.: bearings for machinery, is made in such a manner that it costs less than forty cents per pound, will not answer, for it can't be made and sold for less. To ensure a good article, make it yourself, as follows: Copper, 1 part; antimony, 2 parts; tin, 8 parts. Melt in a crucible, in the order named, turning off as soon as the tin is dropped in, and remelt. The S. S. White Company is now making the above formula. For counter die, use seven parts lead and one part tin, and don't turn too hot; coat the die with whiting. For convenience, moisten the sand with sweet-oil, as it is then always ready for use, and there will be no danger of your cast being spoiled from excess of moisture.

I seldom make the second die, even in sharp, irregular lower cases. The plate will always fit the plaster model, and if that is correct, will, of course, fit the mouth. It is time that zinc was banished from dental laboratories, books of instruction and colleges. There is no more need of it than of the "fifth wheel to a coach." On the other hand, it is simply a nuisance, as any one will say after following the above directions half a dozen times. — HASKELL, *New England Journal of Dentistry*.

SCIENCE—ART.

The subjects of all knowledge are divisible into two groups, matters of science and matters of art; for all things with which the reasoning faculty alone is occupied come under the province of science; and, in the broadest sense, and not in the narrow and technical sense in which

we are now accustomed to use the word art, all things feelable, all things which stir our emotions, come under the term of art, in the sense of subject matter of the æsthetic province.—*Huxley.*

A SUBJECT FOR THE SPECULATIVE.

Mr. Coleman also read a Paper on "Spontaneous Fracture of the Teeth." Cases had been met with in which fracture or splitting of the teeth had occurred without any apparent cause. It had been suggested that this was due to the generation of gases in the pulp cavity ; but Mr. Coleman advanced the theory that it was in some way connected with calcification of the pulp.—*Dental Record.*

CONDUCTORIAL.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

The following is an adaptation of the *Independent Practitioner's* report of the meeting of this Society :

The fifteenth annual meeting of the above Society was held at Albany, May 9th and 10th. There was more than the ordinary number of members in attendance, and the proceedings were of unusual interest. As the society is a representative body, made up in great part of delegates from each of the eight subordinate district societies, all of which must duly report to the parent organization, very much of the time is necessarily taken up by business. But there was abundant opportunity for the reading and discussion of several excellent papers, and for the consideration of many things of moment to the profession.

The Board of Censors met on Monday, the 8th, and had concluded their examination of candidates for the Society's diploma and degree, before the opening of the meeting proper.

The regular sessions began in Geological Hall, at ten o'clock, A. M., of Wednesday, the 9th, Dr. L. S. Straw, of Newburg, President, in the chair. The first session was principally devoted to routine business, the reading of reports from the district societies, the reception of newly elected delegates, and reports of committee. Dr. Charles Miller, of

New York, and Dr. LeGrand Ames, of Albany, were elected permanent members. The President delivered his annual address, which was referred to a special committee. A committee was appointed to report resolutions on the deaths of Drs. W. H. Allen, an active, and Marshall H. Webb, an honorary member. The report of the Treasurer showed a balance of moneys on hand of nearly a thousand dollars; rather an unusual exhibit for such societies.

Drs. N. W. Kingsley, Chairman, and Frank French, Secretary, of the Board of Censors, presented reports from that body. At the meeting held the day previous all the censors were present, and nine candidates for the diploma and degree of the Society were examined. Of this number three had successfully passed the ordeal; namely, J. Howard Reed, of New York, John E. Taggart, of Westport, and W. Carlos Hayes, of Buffalo.

The afternoon session was chiefly devoted to the reading of papers. Prof. Wm. Hailes, Jr., of Albany, by request of the society, presented a number of very beautiful histological preparations for the microscope, and delivered a lecture on *Bacillus tuberculosis* of Koch. Prof. Hailes had made like exhibitions at previous meetings, and has at all times been warmly welcomed, while his microscopical objects have always and deservedly received unstinted commendation.

Dr. S. B. Palmer, of Syracuse, read a thoughtful paper on "Professional Attainments and Popular Needs," and was followed by Dr. A. P. Southwick, of Buffalo, whose subject was "Cleft Palate."

The discussion of these papers occupied the time until the hour for adjournment.

At the evening session, which began at 8 o'clock, three papers were read: "Longitudinal Grooves in Teeth," by C. E. Francis, of New York; "Certain Microscopic Elements in Pulpless and Gum-Denuded Teeth, in their Relations to the Filling of Roots and the Re-attachment of the Gum-Tissue," by J. Edw. Line, of Rochester; and "Disease of the Antrum," by Frank Abbott, of New York.

At the opening of the morning session of Thursday, Dr. C. F. W. Boëdecker and Dr. N. W. Kingsley, of New York, related incidents of office practice, after which Dr. W. H. Atkinson presented a paper on "Disease."

"Artificial Crowns" was the next subject, and Dr. N. W. Kingsley opened the discussion by describing crowns of various kinds which he had been in the habit of using. He was followed by Dr. W. Storer How, of Philadelphia, and the discussion soon became general.

The only paper presented for the Whitney memorial prize was one upon "The Extraction of Deciduous Teeth," by Dr. N. W. Kingsley. The committee recommended that although there was no competition, yet in accordance with established precedent the prize be awarded the author. For want of time the reading and discussion of the paper was postponed till the next session.

Dr. C. A. Woodward, of New York, C. W. Harreys, of Brooklyn, and J. Edw. Line, of Rochester, were elected permanent members.

The election resulted as follows :

President, L. S. Straw, of Newburg ; Vice-President, Wm. Jarvis, Jr., of Brooklyn ; Secretary, J. Edw. Line, of Rochester ; Treasurer, H. G. Mirick, of Brooklyn ; Correspondent, W. H. Atkinson, of New York.

THE *I. P'S.* "LOOK AHEAD."

"It is not, at the present time, either expedient or wise to announce the arrangements which have been made for the future of this journal. In the next issue we hope to be able to lay the whole matter before our readers. Suffice it to say, for the present, that for every dentist who loves his profession and desires its best good, we think a joyful surprise is in store, and that if present projects do not miscarry, a field of usefulness opens before *The Independent Practitioner*, which will be the fruition and accomplishment of all the hopes of its founder. It will be placed upon a secure basis, and beyond the chances of financial disaster. It will be sure of an abundance of excellent matter for publication, and will be certain and regular in its appearance. * * * Until the projected scheme is accomplished it will be managed and conducted by the present editor, to whom all communications should be addressed."

We happen to know something of the "projects" alluded to, and for the sake of all concerned—editor, proprietors and profession,—hope they will not miscarry. The May number from which the above extract is taken is a most excellent illustration of the energy and ability of its editor, by whom the work of preparation and issue were assumed "single-handed and alone." We could give the number of *hours* consumed in the work, but prefer not to have our veracity called into

question. Now that the *Missouri Dental Journal* has entered the depot ranks, it behooves the profession to look well after the two that remain independent of such influence—the *Independent Practitioner* and the *New England Journal of Dentistry*.

FORTHCOMING DENTAL BOOKS.

It is said that Dr. L. D. Shepard, late of the Dental Department of Harvard University, is about to issue a work on Operative Dentistry.

The *New England Journal of Dentistry* says: Dr. J. M. Riggs "is now engaged in writing a treatise on Pyorrhœa Alveolaris, its etiology and treatment." The discussion of this subject first hand is much needed.

Dr. James E. Dexter, of New York, is at work on a "Dental Materia Medica." To those familiar with this gentleman and his methods, it is hardly necessary to say that the book will be just what the name indicates, and not a mere compilation of some medical authority and the United States Dispensatory.

TO SECRETARIES.

Secretaries should look to it that the *Dental Register's* "Directory of Dental Societies" is brought up to date. The directory is a good thing when accurately kept, but this is out of the question without the help of those who should feel most interested. New York's notice, as it now appears, is in its fourth year.

CORRECTION.

We are reminded by a postal from Buffalo that "Rare Cause (?) of Death," page 30 of our April number, should have been credited to the *Dental Advertiser*. Those who file this publication will please take notice.

THE ROLL OF HONOR?

The following is a list of the late "Graduates" of the Wisconsin shame at Delevan: Alfred McDiarmid, Manatoba; E. J. Marsh and Thomas P. Myers, Pennsylvania; Albert E. Oviatt and Charles G. von Suessmilch, Wisconsin; Eberhard F. H. Risch, New York.

AMERICAN DENTAL CONVENTION.

The American Dental Convention will hold its next annual meeting at Saratoga Springs, on the second Tuesday in August, 1883. A large attendance is expected, and quite a number of interesting papers are promised.

A. C. RICH, Sec'y.

GATHER THEM IN.

SOME of our enthusiastic dental statisticians are gathering facts in regard to decay of the teeth in whites and blacks South. Why not extend the inquiry to the effects on the teeth of polygamy? There are fewer better places in the world for such studies than the United States "House of Ill-fame," in Utah. What say you in that part of the Union—Have the seed-teeth run out?

STATE SOCIETY NOTES.

Notwithstanding the failure of one paper to appear, the number read exceeded the programme.

"Sunbursts of eloquence" fails to convey even a fair notion of the efforts of some of our speech-making members.

EVERY body wanted to talk, and every body indulged in that sometimes questionable exercise to the full limit imposed by the rules.

Criticise Heitzman's book as they may, the judgment of all fair-minded readers will be that of a prominent member of our State Society, who said---"There's a good deal of meat in that sandwich."

Dr. E. Parmly Brown could not attend the State Society meeting in May, for which he had been announced for a paper, on account of the severe illness of two of his children. We are glad to learn that they are well again. The doctor's paper will keep, if some other society doesn't capture it.

The temperature is very low indeed when the presiding officer of a certain State Society gets left; but that is exactly what happened not long ago when said officer was denied the poor privilege of playing even a ten spot. But, as the Marquis in the *Merry War* would say, "Perhaps I [we] shouldn't have said that."

PELLETS.

The so-called Richmond crown is a good thing, but the patents thereon are a humbug.

Great Britain's anti-vivisection bill failed utterly, whereat the experimenters are glad.

The elder Tomes has been made a Fellow of the Royal College of Surgeons of England.

Dr. Thos. Fillebrown, of Portland, Me., has been appointed Professor of Operative Dentistry at Harvard, vice Dr. L. D. Snepard resigned.

Charles Reade's "coming man" is here, and a member of our profession. That is to say, Dr. Louis Ottofy, of St. Louis, is ambidextrous.

A conclusion is not necessarily legitimate because it follows "therefore." The reader will please bear in mind that this "saw" is original."

The volume of Transactions of the Illinois State Dental Society for 1882 has as a frontispiece a very good picture of the late Dr. M. S. Dean.

The original articles of this issue should have been credited to the Seventh District Dental Society, before which they were read at the April meeting.

Morrison's diploma mill at Delevan, Wis., has advanced the price of sheepskins from 12 to 25 dollars. So says the announcement. The mill must be crowded with grist.

Cahill says: To be right-handed is to be left-headed, which may be made to read wrong-headed. Perhaps this will explain the frequency with which some of us get left all over.

In his report of a late clinic at the White Dental Depot in New York, the official reporter omitted all mention of the pseudo-inventor and worthless-patent owner as a "slugger."

"Trusting that the liberality, for which the dental profession is noted," etc. When the average dentist reads that, he will cover himself with shamefacedness, and pray that some one throw cold water on him. "Liberality!" Have the publishers of the M. D. J. ever been away from home?

"It is the only publication of the kind west of the Mississippi," say the publishers of the *Missouri Dental Journal*. If the *Dental Jairus* folks ever catch them in San Francisco, Thraillkill 'em sure.

THE *Southern Dental Journal's* pictures of the officers of the Southern Dental Association is somewhat of a new departure in dental journalism. More than one of them seems to say—"I'm an old sea-dog."

At the close of Dr. Morell Mackenzie's lecture at Bellevue Medical College, New York, one of the students from "out West," remarked to his neighbor, "That fellow talks our language very well for a foreigner." —*Lancet*.

Perhaps this "out West" student had once sat through Henry Irving's attempt at *Romeo*. The junior Salvini's English was a little off during the winter, but Irving's ———. They ought to travel together.

When you say to a man that he contains 1 part of alcohol to 195 parts of blood, you convey to him in a scientific way the fact that he is "dead drunk." He may not know it, but that, nevertheless, is his condition.

Bartholow says *hypodermatic* in place of *hypodermic*, for reasons philological; and some one else has claimed, in the *Medical Record* we think, that *policlinic* is correct, and *poly* with a *y* otherwise. And again "de sun do move."

Let no man again forget—not even the censors themselves—that the following now constitute the 7th District Board: '79, J. D. Maynard, vice B. F. La Salle; '80, J. Edw. Line; '81, Geo. W. Tripp; '82, H. C. Knickerbocker; '83, J. S. Walter.

The *Dental Cosmos* for May pays its respects to James Hardie's "Dental Vade Mecum." If one may judge by extracts from this alleged book, Artemus Ward would, if now alive, travel long and far before meeting a better specimen of the genus *Damphool*.

The *Medical Record* says: The Baltimore Medical College, which was started two years ago on a "Christian" and co-educational basis, has * * * abandoned both these features, "not that it loves Cæsar less," but prefers substantial success to the propagation of ideals.

The April number of the *Missouri Dental Journal* is the first issue under the new management, and it Pearson a cursory reading as if

somebody had, in his early days, received many kindly, perhaps fatherly, Patterson the head, sufficient at least to make its readers Hungerford more from the same source. "Come again?"

Labor with your representative, if acquainted with him, to vote for the bill to place the property of the Army Medical Museum and Laboratory in a fire-proof building. In its present place a single night would suffice to sweep away the accumulations of years, the greater part of which money could not replace. The Medical Society of West Virginia will provide the necessary papers.

We have seen and heard a great many electric mallets, but up to the present time one only has caught our fancy and caused us to covet our neighbor's goods; and that one belongs to Dr. James E. Dexter, the inventor of it. He is willing to put it on the market, but is not willing to share the profits thus,—Manufacturer : Inventor :: 99 : 1. And nobody blames him. It is the best thing of the kind and worth paying for. Some manufacturers *do*, and the profession *will* know it.

MICROSCOPICAL.

CHLORIDE OF GOLD.

Take a saturated solution of chlorine in water, four ounces, add to this a sheet of No. 4 gold foil (4 grs.) rolled into a very loose rope (two sheets of No. 2 is better), cork tightly, and set in a dark place for twenty-four or forty-eight hours. At the end of this time a test will show a solution of gold, though the foil may not have entirely disappeared. Now uncork the bottle and set it in the sun to get rid of the free chlorine. The result will be a slightly acid solution of chloride of gold, which answers quite well for the staining of microscopic preparations. I have so used it for many years. Some care is required to prevent the deposit of metallic gold in the tissues.—BLACK, *Ohio State Journal of Dental Science*.

Dr. H. H. Langworthy, of this city, believes with many others, in "white cloud" illumination, or its equivalent, and secures the latter by fixing to the under side of the stage a thin piece of mica, the upper surface of which has been thoroughly rubbed to a ground-glass appearance by means of fine emery paper or powdered pumice.

A MICRO-MATHEMATICAL MIX.

While pointing out a few of the advantages of a certain electric mallet, the inventor said to us, "Electricians have examined this feature and pronounced it perfect—and by the way, I mean *professional*, not *dental* electricians." When a dental or medical microscopist says, "It is thus," and a professional microscopist says, "Nay, but thus," we had better lean toward the latter, for it is the professional microscopist who is best qualified to inform us of "what we will and can see" under given conditions.

SOME LINES.

When Dr. Curtis figures the size of lines which he allows as possible to be seen to $\frac{1}{143528}$ of an inch, and thinks that while we may see these lines, we might not see, say $\frac{1}{143529}$ of an inch, his figuring becomes perfectly untenable. All these prophets who tells us what we will and can see, are false prophets. If we magnify with lenses properly and perfectly made, we may apply rather the following calculation: We can see a piece of wire $\frac{1}{20}$ of a millimeter thick without difficulty with the naked eye. If we apply a microscope with 2,000 magnifying power and sharp defining power, both of which are practically feasible, we get $\frac{1}{1000000}$ of an inch; lines about $\frac{1}{7}$ the thickness of the lines which Dr. Curtis declares to be our limits allowed to us by him.—*New England Journal of Dentistry*.

LINES MORE OR LESS TO ORDER.

It may be well to call attention to the fact that the appearance of lines in the images is no evidence that the image is produced by lines. This fact seems to have been quite overlooked by some writers. The dots of *P. angulatum* may be made to appear like lines, and many other cases of similar nature might be cited. Again, the number of lines in an image is, alone, no evidence of the number on a lined object under examination. Prof. Abbe and Mr. Crisp, of London, have given satisfactory ocular proof of this fact, and also Mr. Warnock, of this city, who has a plate with a known [not necessarily by count of them on the plate, but by the gauge of the machine in which the plate was made—ODONTO. JOUR.] number of lines in a given space, with which he occasionally entertains his friends by so adjusting the light that the number of lines in the image is doubled.—*American Monthly Microscopical Journal*.

OBLIQUE-LIGHT REFLECTOR.

In closing an interesting communication to the *American Monthly Microscopical Journal*, in which he reviews the many good features of Abbe's Condenser and calls attention to the limitations to its usefulness—limitations inherent in its construction and application,—Gundlach expresses himself thus :

“These examples satisfy us that the Abbe condenser, useful as it is, by no means fully meets all the requirements of oblique illumination, and that practically this illumination can not very well be made of greater angle than it already has. Hence we have either to find some other suitable means of obtaining still more oblique illumination, or to give up as useless, the increase of the angle of the objective for an increase in performance.

“So, it is wise to consider the solution of this problem of illumination before the further improvement of the objective by the increase of an-

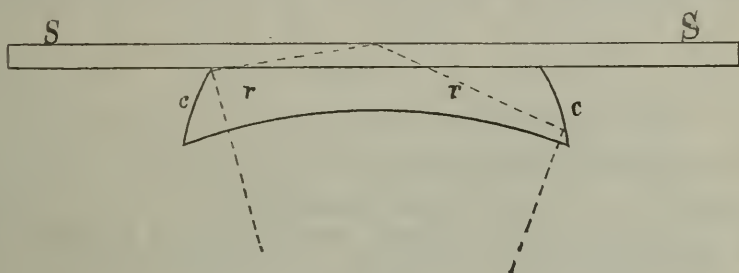


FIG. 1.

gle. In this direction, I desire to submit for consideration the idea of an oblique light reflector represented in fig. 1. *S* represents the object-slide ; *r* the proposed reflector. It is a section of a sphere. The upper, plane surface is to be brought in contact with the slide by means of a suitable fluid in the usual way. The under-surface is concave. The dotted lines show the direction of the light, which undergoes an inner total reflection at the surface *c, c*.

“Perhaps this reflector will answer for the next limited period ; and, when even this shall prove to be insufficient, I propose to mount the object on the plane surface of this reflector. In this way, the theoretical limit would be reached, and opticians can go on constructing objectives that will take and utilize the oblique light of this reflector.”

The “idea” which he desired “to submit for consideration” has since been embodied in glass and may now be tested by any one whose work is done with high angle objectives. The reflector is accompanied

by two diaphragms, one for symmetrical or double oblique illumination—illumination from opposite sides of the same reflector,—the other for unsymmetrical or single oblique illumination, or illumination from but one side.

AMPHIPLEURA PELLUCIDA DID IT.

Inexpressibly sad was the fate of another American microscopist who lived before the time of immersion-objectives. He was a searcher for diatom markings—a determined seeker after the shadowy tracery supposed to exist in the filmy *Amphipleura pellucida*. He was a physician; but the infatuation of staring through his microscope, in a vain effort to “resolve” this misty diatom, gradually absorbed all his time, destroyed his practice, and so encroached upon his means that he became poor. Finally, his one-tenth-inch objective, by Spencer, became the substitute for his best suit of clothes. A fifteenth, and then a twentieth objective, by Wales, took the place of his pawned gold repeater and auction-sold library. His shining silk hat and his sleeve buttons were forsaken for a slouch “Derby” and an achromatic condenser. He wore a shirt two days to save washing bills in order to obtain an Abraham’s prism, and he starved himself on cheap victuals that he might buy a second prism for an additional ray of oblique light. He neglected his friends, who never saw him when his head was not bent over the microscope. Weaker and weaker he grew in his wild chase after the phantom lines, till death overtook him one night as he sat in his barren room, surrounded by glittering brass tubes and flashing accessories, and his last breath was spent in a feeble attempt to whisper faintly, “Wider angle.” — *American Monthly Microscopical Journal*.

TO STAIN NERVE-FIBRES.

A new method of staining the nerve-fibres in the central nervous system, is described by Prof. Weigert (Leipsic). The method consists in staining the preparations in acid fuchsin (Fuchsin, S. 130 of the Berlin Aniline Manufacture), washing in a weak alcoholic potash solution, and then mounting in the ordinary way in Canada balsam. This method has great advantages above all other methods; it selects the nerve-fibres only, of which it stains portions of the medulla, while it leaves the axis cylinder free, and it picks out the smallest fibres, such as no other reagent, not even gold chloride, does.—*Dental Record*.

To our English friends who are interested in the microscope and appreciate fine workmanship, we would say not to fail to call on Mr. Crisp, of London, the foremost collector of stands in the Kingdom, and examine the latest effort of the Bausch & Lomb Optical Company of this city. This particular stand is a binocular of the "Professional" pattern, and shows at a glance the capabilities of Americans in the manipulation of a material much used in this country in the adornment of cheek.

Dr. C. F. W. Böedecker has changed his residence and office from 54 to 60 East 58th street, where he is fitting out a private histological laboratory in one of the upper stories, and will have as an associate a young medical man whose histological studies were prosecuted under the eye of Stricker.

For a funny attempt at book review see *The Microscope* for April. Heitzman will probably order his publisher to suppress all further issues of his "Microscopic Morphology."

Carl Heitzman is now in Europe, but will return in time to give his personal attention to those who join his fall classes in histology.

' "LITTLE BIRDS IN THEIR NESTS AGREE."

The following clippings from San Francisco papers suggest pistols and coffee for a whole crowd:

THE BONE.

When a healthy tooth, before vitality is extinct, is imbedded in the comb of a cock, it is there bathed in healthy blood, and in the majority of cases the vitality of its tissues is maintained, natural adhesions take place and the tooth is soon growing in its new resting place. Some time ago Dr. Younger thought that this practice might be made use of in dentistry. Sometimes teeth are transplanted from one person to another, but a large number of good teeth are lost for this purpose, as the transplanting has to be done within a short time after extraction. When, therefore, a person is willing to have a tooth transplanted to his jaw, it is difficult to find a tooth to transplant. By transplanting to the comb of a cock good and healthy teeth may be preserved ready for instant use. Dr. Younger determined to try the experiment, and over two weeks ago extracted from the overcrowded jaw of a young lady a bicuspid tooth, which was transplanted to the comb of a cock. There

it throve for ten days. About a week ago a young gentleman had a bicuspid extracted and wished to have one inserted in its place. The young lady's tooth was brought into requisition, and five or six days ago the cock was brought into the operating room, and was placed under the influence of chloroform. The tooth was taken out and was transplanted to the jaw of the young man, where it is now growing finely. Adhesions have taken place, and the experiment has, therefore, proved successful. It is the first operation of the kind that has ever been made.

THE CONTENTION.

Dr. W. J. Younger exhibited to the Association the rooster upon whose comb was grafted some teeth, and explained his plan of preserving teeth alive in this way until it was desirable to transfer them to the mouth of the toothless patient.

Dr. S. W. Dennis read what purported to be a paper on the same subject by Dr. Hunt of Cincinnati, by which it appeared that the experiment of Dr. Hunt antedated that of Dr. Younger.

Dr. Alexander Warner insisted upon seeing the journal from which Dr. Dennis read, and having obtained it, with some difficulty he read from it, and stated that by the alteration of some important words in the reading the whole tenor of the article had been changed, and that there was nothing whatever in Dr. Hunt's experiment to detract from the praise due to Dr. Younger.

At the evening session a motion was made to expunge from the minutes a resolution passed last year expressing a want of confidence in the Dental Department of the University, alleging that unworthy persons were connected with it.

Dr. Dennis is the head of the Dental Department of the University, and upon the refusal of the Association to expunge the resolution, tendered his resignation as a member of the State Dental Association.

Dr. Younger moved the acceptance of the resignation, saying: "A man who has been caught falsifying a record, as he has this afternoon, is not fit to be a member of this Association."

Dr. Plumteau—Dr. Dennis' reputation is not half as black as those vilifying him.

Dr. Younger—My escutcheon is as pure as the snow from Heaven. No man can truthfully say that there is a single blot upon it, and he who says there is, lies.

Dr. Plumteau—Do you mean to say I lie?

Dr. Younger—Any one who says there is any stain on my reputation lies, and if you say so, you lie !

Dr. Plumteau—You'll hear from me.

Dr. Dennis' resignation was accepted, and it was followed by that of other gentlemen, whose connection with the Dental Department of the University made such a step in their opinion necessary. Those resigning were Doctors Dennis, Plumteau, McLain, Goddard, Morfew, Sichel, Richards and Davis.

THE INNOCENT ABROAD.



The correspondent to whom we are indebted for the above clippings sends the accompanying illustration of a successful case of *dento-henology*, the original of which is "preserved in the pathological department of the Hunterian Museum, London." The preserving fluid is not mentioned—probably alcohol or imagination. Either one will do and is probably better than the other.

BOOKS, PAMPHLETS, PERIODICALS.

NOTES ON OPERATIVE DENTISTRY. By Marshall H. Webb, D. D. S., Philadelphia: The S. S. White Dental Manufacturing Company. Pp. 175.

The preface says: "These Notes on Operative Dentistry are published for the purpose of aiding those engaged in performing operations for the preservation of the natural teeth, and to enable the earnest, careful student, who possesses the necessary ability to become such a practitioner as every one should desire and aim to be,—the author believing that if the methods described are faithfully followed each such student can make of himself a really fine operator."

The subjects discussed are arranged under the following heads: Histology, the deciduous teeth, application of the rubber dam, preparation of filling-material, the mallet, filling cavities in masticating surfaces, filling cavities within labial and buccal walls, pieces of porcelain for filling cavities, filling cavities within approximal walls, preparation of cavities for restoration of contour, restoration of contour and prevention of extension of decay, summary of principles relating to filling teeth, covering and protecting frail walls of enamel with gold, placing crowns on roots of teeth, attaching crowns to teeth where roots are missing, irritation and death of the pulp, filling pulp-chamber, treatment of abscess, peri-cementitis, necrosis.

All these subjects are discussed briefly, and yet at sufficient length to leave no doubts in the mind of the student as to just what the author means. Those who have kept the run of Dr. Webb's contributions to dental societies and the journals will recognize in the several chapters the substance of pretty much all that he has written.

The book is very fully illustrated, well printed on the best of paper, handsomely bound, and has at the front an excellent phototype likeness of Dentistry's marvel of manipulative ability.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION. Twenty-second Annual Session (1882), Cincinnati, O. Philadelphia: The S. S. White Dental Manufacturing Company. Pp. 162.

TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY. Eighteenth Annual Meeting (1882). Quincy, Ill. Pp. 183.

Both mailed to wrong place, and detained, hence our failure in the April issue to acknowledge their receipt.

A DESCRIPTION OF SOME OF THE BRACES, "MOVEMENT-CURE" MACHINERY, AND MASSAGE-APPARATUS NOW IN USE AT THE SURGICAL INSTITUTE. Philadelphia, Pa. By J. G. Allen, M. D. Pp. 10.

Whether of practical importance to the reader or not, it is worth sending for, if only to satisfy one's curiosity in regard to machinery used in correcting human deformities. In its present form the paper is a supplement to the March number of the *Medical Bulletin*.

SOME OF THE OPPORTUNITIES, RESPONSIBILITIES AND ENCOURAGEMENTS OF LIFE. An Address before the Massachusetts Dental Society, Dec. 14, 1882. By C. A. Brackett, D. M. D., Newport, R. I. Pp. 19.

PREISVERZEICHNISS MIKROSKOPISCHER PRÄPARATE UTENSILIEN UND MATERIALIEN ZUR ANFERTIGUNG DERSELBEN. 1883. Issued by J. D. Möller's Institut für Mikroskopie, Wedel in Holstein. Pp. 40.

THE ODONTOGRAPHIC JOURNAL.

VOLUME IV.—*October*, 1883.—3.

CARBOLIC ACID.

BY FRANK FRENCH, M. D. S., ROCHESTER, N. Y.

[Read before the Dental Society of the State of New York.]

Tar, with what is obtained from it by distillation, is a complex product. We will only refer to two substances, viz. : Creosote, which is obtained from wood tar, and Carbolic Acid, which is obtained from coal tar ; and though differing in composition, their action is very much alike.

Creosote is found in the products of dry distillation of wood, and of various vegetable as well as animal substances, and of Benzoin resin, used in fumigation. Tar barrels, which have been burned in time of epidemics to purify the atmosphere, give out this substance, but would give a greater quantity if the flames were suppressed, and distillation only allowed.

The world has admired this substance without knowing of its existence ; has sought for it, using various names to express it ; wrapping it in bundles to carry around them, burning it in pastiles for fumigation, and sometimes in public in great bonfires. The most civilized peoples of olden times, kept in the products of tar, the dead that they desired to preserve to a joyful uprising.

Thus we see that the antiseptic properties of tar were known at a very early period, but the process of extracting its subtle essences, and bringing them into general use, was reserved for the 19th century.

Creosote was discovered in 1832 by Reichenbach ; it is officinally described as a peculiar substance obtained from wood tar. It is a colorless oily liquid, of a peculiar disagreeable penetrating odor, resembling that of wood smoke, and has a burning, acrid taste, which is perceived throughout the whole extent of the buccal, nasal and pharyngeal mucous membrane. It burns briskly in the air, emitting large volumes of smoke. It coagulates albumen, but exerts no action upon fibrin. It is sparingly soluble in water, but readily so in ether, alcohol, acetic acid and the essential oils. It acts as a solvent of iodine, phosphorus, sulphur and the resins. Its action, both upon animal and vegetable organisms, is so identical with that of carbolic acid, that there is no real reason for giving it the preference which some do, even if it could be obtained pure, which is nearly impossible. In fact, *pure* creosote is almost a myth. Dr. Brophy says : " Of 25 samples of creosote, purchased from as many different dealers, I find on examination that, with one exception, all contain carbolic acid ; some were pure carbolic acid." This being the case, is it not preferable to use pure carbolic acid, and call it so, rather than use a mixture and call it creosote ? They may be distinguished from each other by the following tests :

Carbolic acid becomes solid at ordinary temperatures, while 17° below zero does not affect creosote.

Carbolic acid is soluble in water, 1 part in 95, or 1 in 20 of boiling water, and this solution is colored a deep violet purple by the addition of a solution of ferric chloride. Creosote is soluble in water, 1 part to about 125, and is colored brown by ferric chloride. An alcoholic solution of carbolic acid is colored a light olive green by ferric chloride ; an alcoholic solution of creosote, a dark sea-green. Carbolic acid forms a jelly when shaken with collodion ; creosote does not.

Carbolic acid was discovered by Runge, in coal tar, in 1834, and given the name it now bears. It is procured from coal tar by distillation, at a temperature of from 300° to 400° Fah. In 1841 it was investigated by Laurent, who gave it the name of Hydrated Oxide of Phenyl ; it was afterwards called Phenic Acid, and, as it is closely related chemically with the alcohols, it was called by some Phenyl Alcohol. It is, however, best known by the name given it by its discoverer.

Before its use separately, its virtues were exhibited in the crude material known as coal tar, in 1844, by M. Bayard. About 1860, Kuchenmeister used it under the name of "Spirol," both in medical and surgical practice, and as a means of arresting putrefaction and preventing the development of fungi. In 1863, Dr. Lemaire issued a treatise upon Phenic Acid, illustrating its power of preventing fermentation and putrefaction, and its application to medical and surgical uses. In 1865, M. Déclat illustrated the power of the acid to destroy the microphytes and microzoaires, developed during fermentation and putrefaction, and of preventing the changes which constitute these processes. After this it came into general use, both in this country and Europe. Its vogue is chiefly to be ascribed to Prof. Lister, who commenced its use as a surgical dressing in 1865.

Carbolic acid, in its pure state, is solid at ordinary temperatures, and is either in acicular crystals, or crystalline masses; colorless when pure, but when impure a reddish brown, or becoming so on exposure to light and air, which is said to be caused by the presence of xylic and cresylic alcohols, which always accompany it in its impure state, and adhere to it tenaciously. On exposing the crystals to the air they attract moisture and deliquesce. It becomes liquid by the presence of water in very small quantities. With regard to its solubility in water, there is a great diversity of opinion in regard to the proportions. It is claimed to be soluble in 15 per cent. of water, and from that, all the way up to 95 per cent. I find by experiment that the crystals will absorb 10 per cent. of water by weight, and become perfectly liquid. After that proportion of water has been taken up, there is no union of the acid and water until 95 per cent. of water has been added, at which point the acid is entirely dissolved, but not before. It is, however, perfectly soluble in 20 per cent. of boiling water. It is very soluble in ether, alcohol, acetic acid, glycerine, and the fixed oils. It is inflammable, burning with a reddish flame and dense volume of smoke; it melts at from 95° to 106°, and boils at from 359° to 370° Fah. Nitric acid converts it into picric acid, and it is largely used in its manufacture. It reduces many metallic salts, especially those of silver and copper; with alkalis it forms acid salts, and combines readily with iodine, bromine, quinine, &c. As generally sold, if pure, it is an oily, colorless liquid, with a strong smell like creosote, and having like it a pungent acid taste. With regard to the propriety of calling it an acid, it does not respond to the usual test with litmus paper, when tested at full strength, but in a solution of 5 per cent. carbolic acid and 95 per

cent. of water, we get a decided acid reaction, coloring blue litmus paper red almost instantly. Why the addition of water should change a neutral solution to an acid, I am unable to state. I discovered this acid property accidentally, about a year ago, while making some experiments. It may have been known to others, but I have seen no account of it.

As a therapeutic agent it is invaluable, as it possesses stimulant, narcotic, irritant, styptic, antiseptic and escharotic properties. It unites with albumen and gelatine, forming with them insoluble compounds. It has remarkable antiseptic powers, and consequently is a valuable topical application, in cases attended with offensive purulent or other discharges, but it is not a disinfectant, as generally considered. It prevents decomposition, but does not destroy or render inoffensive the products of decomposition. It is commonly used as a deodorizer, but is not one; it has *no* action upon foul emanations. Its operation consists in preventing their generation, by arresting putrefactive changes in the substances which exhale them. Lemaire claims that these changes are due to septic infusoria in the atmosphere, which, "when admitted into wounds, ulcers, etc., produce a decomposition in the part and its secreted fluid, aiding the formation of pus; that this decomposition is effected by a vital action, similar to the production and multiplication of organisms in fermentations; that carbolic acid in small doses has the power of preventing and arresting any such decomposing effects from these organisms, by at once and immediately destroying the life of the organisms themselves."

Whether this view be correct or not, it is undeniable that it will prevent putrefaction, or arrest it where it has already begun, and when putrefaction ceases, the foul emanations cease also, and this is undoubted the way it works when applied to drains, sewers, etc., and decayed substances, whether animal or vegetable.

All the lower forms of vegetable organic life are destroyed by carbolic acid. It arrests fermentation, destroys mould and mildew, and prevents the germination of seeds in water containing a rooth, or zooth, part of this acid. A strong solution applied to the roots of trees and shrubs kills them, and if to the flowers, leaves and fruit, these die.

On animal organisms a very small proportion of it in water containing bacteria, amoebæ, and other infusoria, speedily destroys them. It is equally destructive to the life of ascarides, earthworms, caterpillars,

fleas, moths, ants and other insects. Fish, frogs and leeches die speedily in a solution of it, and two or three drops applied under the wing of a sparrow, produce convulsions and death. In the case of dogs, a five per cent. aqueous solution administered, causes them to fall, cough, become convulsed, and then paralyzed in both sensation and motion; the acid is exhaled in breathing, and they gradually recover. One-half fluid drachm dissolved in twelve fluid drachms of glycerine, and thrown into the stomach of a dog, caused all the above symptoms, and in addition a bloody froth was ejected, and death ensued suddenly in ten minutes after administration. After the death of animals from poisonous doses, extreme congestion is found of the brain and its membranes, alimentary canal and the lungs. The blood is not coagulated. On men, when six or eight grains in a wine-glass of water are taken, a sense of numbness is felt on the lips and in the mouth, followed by a sensation of coolness. If the stomach is empty, slight nausea, and an uneasy sensation in the abdomen follows, with vertigo, singing in the ears, and slight deafness. When swallowed by accident, or design, the mucous membrane appears as if brushed over with a strong solution of nitrate of silver, and becomes hard and dry, like leather. This change in the condition of the mucous membrane is due to the power of carbolic acid to coagulate the albumen of the tissues. From medicinal doses, a cooling, grateful effect is felt in the stomach. Cases of poisoning have resulted from local applications. The warnings of danger, which may be expected when the remedy is brought in contact with the tissues at any point, are, besides the local irritation, sudden vertigo, contracted pupils, pallor of the face, difficult respiration, and feeble circulation.

When the dose is a fatal one, unconsciousness quickly follows; the breathing becomes stertorous, the surface grows cold, action of the heart more and more feeble, and death finally occurs from failure of respiration. Convulsions occur in animals, but in man this symptom is lacking. The poisonous effects of carbolic acid are remarkably uniform for the same dose. An ounce or more, taken by an adult, produces an intense burning pain in the throat and œsophagus, followed by staggering as from intoxication, and then complete insensibility. The face is pale, lips and hands livid; the pulse, sometimes above and sometimes below the normal rate, is soft and compressible; respiration stertorous, tongue swollen, and a discolored foam on the lips. The skin, breath and urine smell strongly of carbolic acid. Death has occurred in a few minutes; in most of the fatal cases in from one to

three hours, and they hardly ever live two days. It affects the urine, even when applied locally, and one of the earliest indications of toxic action is a dark greenish, blackish or smoky hue of the urine. Städeler claims to have discovered carbolic acid in normal urine, but this is disputed. In cases of poisoning, the stomach should be emptied as soon as possible, and albumen in the form of fresh eggs, largely diluted with cold water or milk, freely administered. Saccharate of lime is a chemical antidote, and in cases of poisoning may be used freely. Oils and glycerine should not be given, because they favor absorption, but vegetable demulcents used freely, in order to protect the mucous membrane as much as possible. Atropia is a physiological antagonist of great value. The application externally has sometimes been fatal. Three women used crude carbolic acid for itch, mistaking it for sulphur ointment, applying it all over the body with a sponge. One died in three hours, another in two days, and the third recovered after an illness of three weeks. Another case of a female child, who sat down upon a block which had been freely sprinkled with a solution of an ounce of acid to one quart of water. Blistering, followed by ulceration of the labia and buttocks, took place, and the child died on the tenth day.

For internal use, the dose is from one-fourth to two grains, in a wine-glass of water. One or two drops in a glass of water will arrest nausea and vomiting. Cholera morbus and cholera infantum are frequently checked by its exhibition. Eructations of gas, and flatulence, due to fermentation of food, are arrested by it. Inhalations of carbolic acid spray, of the strength of one per cent., are useful in chronic nasal catarrh, hay fever, and whooping cough, which is said to be due to the fact that it destroys the minute organisms which cause the morbid action in these maladies. Schnitzler, of Vienna, employed the subcutaneous injection of it in more than 100 cases of consumption, using from one-eighth to one-fourth of a grain once, and in some cases twice daily. In many cases the fever lessened, pulse became slower and stronger, and night sweats diminished.

Based on the germ theory of disease, it has been used with some success in typhoid fever, diphtheria, scarlet fever and erysipelas. In parasitic skin diseases a weak solution is very serviceable. It is largely used in surgery in carrying out the antiseptic system of Prof. Lister, who, believing that suppuration, pyemia, and various other troubles connected with open wounds, arise from the irritation of minute germs

contained in the air, devised a process by which the air, before reaching the raw surface, is filtered through carbolic acid, and thus deprived of its irritating properties. He prevents the access of air during operations, by surrounding the part with an antiseptic atmosphere, composed of a sprayed watery solution of carbolic acid, 1 to 40. The instruments and fingers of the surgeon are washed with carbolized oil, and the arteries tied with carbolized catgut ligatures. By adopting these precautions, and the careful dressing of wounds, he has obtained excellent results, not only after ordinary operations, but in chronic abscesses, and various diseased conditions connected with the joints.

Strong carbolic acid applied to the surface of healthy skin, causes an immediate tingling and burning sensation; the spot becomes white, and the skin around it is tinged with red; the symptoms are similar to those resulting from the application of a powerful caustic. In a few days there is exudation from the surface, sometimes dry and scaly, but frequently there is formation of pus. Dr. Bill was the first to demonstrate the anaesthetic properties of carbolic acid. He states that "by applying a solution of it to the integument, insensibility to pain may be sufficiently induced to permit free incisions without suffering." It coagulates the blood, but does not stop bleeding. In solution, it coagulates albumen, arrests fermentation, instantly destroys the lower forms of animal and vegetable life, and in very small proportions prevents mouldiness in vegetable juices, and protects animal substances from putrefaction. In a solution of 1 to 500 it destroys vegetable mould, and is equally destructive to minute organisms. According to Dr. Neuman a solution of one per cent. is sufficient to destroy bacteria. It was mentioned here, last year, that bacteria had been seen crawling over crystals of carbolic acid. I think the crystals, like those of many other acids, are inert, and must be in solution to produce an effect. It is very certain in many cases, we get better results from a diluted solution than from full strength.

It seems to have the effect of promoting growth of healthy granulations, and hastening healing processes of wounds. It relieves pain without causing inflammation and arrests suppuration. Its application should be repeated as long as pus is formed on the surface of the wound, but should not be applied so long as the eschar from the former application remains attached. It is an irritant, and if applied long enough to the skin will cause sloughing. It is an escharotic, and if applied to the integument or mucous membrane, produces a burning

sensation of short duration, and there is formed a whitish superficial eschar, said to be due to the coagulation of albumen, which subsequently becomes brownish and drops off. As regards the strength in which carbolic acid should be used, it must be governed by the exigencies of the case, and the judgment of the operator. For external use where escharotic action is desired, as in gangrenous or specific ulcers, it may be used in the strongest liquid form; but for ordinary skin diseases, a solution of from one to five per cent. is sufficient, also where a gentle stimulation is desired in order that the parts may take on recuperative action. Where prompt, decisive action is required, and heroic treatment demanded, it may be used full strength, but where only gentle stimulation is desired, a five per cent. solution is sufficient. Ulcers and suppuration, whether on the outer surface or from the mucous passages, are benefitted by its use, and fistulous ulcers, especially those connected with the mouth, are generally controlled by it. It has been highly recommended as a dentifrice in carious teeth and offensive breath. On account of its anaesthetic properties it relieves pain caused by an exposed pulp almost instantly, and is useful to apply to the pulp before applying arsenic, when it is necessary to destroy it. Some good operators claim that they are able to extirpate the pulp alive, almost painlessly, by working carbolic acid in between the pulp and walls of the canal with a fine broach.

Where the nerve is exposed, and it is desirable to save it alive, it should never be used full strength, as its escharotic action may cause sloughing, and being confined under the material used for capping, the death of the entire nerve is apt to follow; but a solution of one to five per cent. may be used with great benefit in such cases, as it is a gentle stimulant, slightly antiseptic, and will not cause sloughing and death.

Applied in full strength to a cavity just prepared for filling, a painful burning sensation is experienced for an instant, and the cavity is not only less sensitive, but that portion of the tooth seems to lose a portion of its conductivity, so that it is less sensitive after being filled than it would be if it were not used. This is said to be due to its coagulating the contents in the ends of the freshly cut tubuli, and thus breaking the connection of conductive power between the filling and the nerve. It is also claimed that its use in cavities before filling, renders inert any small particles of decayed matter that might possibly remain. Brophy says: "It is a most excellent remedy to apply to carious teeth during the process of excavating, to enable us to more clearly see the extent of

the caries; in many cases we are surprised, upon moistening the cavities with it, to find carious tissue, which, if permitted to remain, would soon render another operation necessary."

Sensitive cavities are rendered much less so by applying carbolic acid, full strength, then inserting a gutta-percha filling; allowing this to remain a few days, the cavity may be excavated with very little pain. It can be used in this way as an obtunder without endangering the pulp.

It is an excellent dressing for nerve canals after removing the pulps, as it closes the ends of the tubuli by coagulating the contents; but as in destroying the pulp we sometimes destroy the contents of the ends of the tubuli, or the ends of the so-called soft fibres of Tomes, it would be safer to slightly enlarge the canal so as to reach what has been called the "dead line," before applying the carbolic acid.

It is the custom of many operators before filling nerve canals to close the apical foramen with a small pledget of cotton, saturated with carbolic acid, on account of its antiseptic properties. This is condemned by some, but where carefully done, the results are almost uniformly good. It has been claimed that a saturated solution of iodine in creosote or carbolic acid has been successfully used in cases where there is wasting of the gums and processes, with exudation of pus and loosening of the teeth, changing the pus-producing surface. It stimulates those parts which are weak, but still have vitality enough to be restored, and destroys those which have not. It should not be applied oftener at first than once a day, and after a few applications once in two or three days. It should be applied carefully, to avoid coming in contact with healthy parts, and covered with a saturated solution of glycerine and tannin.

In the treatment of nearly all cases of abscess, where it is not accompanied by necrosed bone, carbolic acid may be regarded as nearly a specific, but where necrosis is present other treatment is indicated. In using it where it comes in contact with the skin, its caustic action can be overcome by rubbing the parts with oil. In the treatment of alveolar abscess, the dentist comes to regard it as a sheet-anchor. Many other remedies have been used, but none of them seem to take its place. There is a diversity of opinion concerning the strength of the solution to be used in such cases. Where there is a fistula I always use full strength, pumping it with a piston through the root, until it

comes through the fistula clear and free from pus. If necessary I repeat it in two or three days, but rarely have to use it more than twice. It should not, however, be used until a disinfecting agent has been applied in the root, otherwise the effete matter in the tubuli will be coagulated, and remain to give rise to trouble through the tubuli into the lacunae and thus through the cementum. These are dead men that sometimes will not rest quiet in their graves.

The uses of carbolic acid are so numerous as to make it impossible to refer to more than a few in a paper of this kind. In very small quantities it is azymotic *i. e.*, fatal to all the lower orders of animal and vegetable life; it is also anti-septic, *i. e.*, opposed to putrefaction or decay, even preserving the organisms which it kills. By good authorities all epidemic, contagious and infectious diseases are believed to be zymotic, *i. e.*, of the character of a fermentation dependent upon living organisms; now as all the processes of decay and putrifaction are dependent upon fermentations, which are caused and kept up through the agency of cell-life, or organisms of low vitality, in fact are also zymotic, a good key to its powers and uses is at once obtained, and at the same time a good guard against its misapplication.

The hurtful material in foul emanations and foul air may be inodorous and insensible, but is endowed with vitality, and the laws of nature tend to direct the material to a soil and climate fitted for its functions of germination and reproduction. If the azymotic could be distributed in the same way, there would soon be an end of zymotic disease, but with it an end of all fermentation and an end of the present order of creation, in which fermentation performs an indispensable part.

Since writing this paper I have been informed by Dr. T. H. Smith, of Bloomington, Ill., that common vinegar is a perfect antidote for the action of carbolic acid, internally as well as externally. I have had no opportunity to verify his statement with regard to its internal action, but in several cases externally it has been applied with the most satisfactory results, stopping the action of the carbolic acid at once, and no unpleasant effect following.

DENTAL PERIOSTITIS—THE GRINDSTONE CURE.

BY JOS. REQUA, ROCHESTER, N. Y.

[Read before the VIIth and VIIIth District Dental Societies, October, 1882.]

A peculiar phase of periostitis, with accompanying discomfort and toothache, has so forced itself upon my attention the past year, and has been so interesting to me, that I wish to call your attention to the subject, and will do so by giving the history of a few cases.

The teeth and their surroundings, to be maintained in health need exercise, such as they get or ought to get in the mastication of food. In order to get this exercise they must have antagonists. Usually when a tooth has lost its antagonist we see it slowly and surely losing its firmness and becoming elongated, or leaving its socket. On the other hand it must not be subjected to immoderate usage and pressure, such as a molar or bicuspid would get if we were to fill the crown with gold or other hard substance and leave it too full; or such as it would get if an individual tooth were harder than the other and thus less subject to wear by attrition.

Now there is nothing new in all this, and yet I fear there are some among us who do not give sufficient attention to—if I may be allowed the expression—the harmonious antagonism of the teeth, especially in cases of obscure pain.

A year ago a lady of middle age with full compliment of teeth containing several fillings, all of which were gold, complained of uncomfortable feeling in the region of the upper left molars. I examined them, but failed to find the cause. A week later she came in with "there must be a cavity in one of these teeth, as hot and cold liquids give me severe pain." I spent half an hour in a further examination. The verdict was—no cause for action. A week later and a draught of air through the mouth gave pain. Then for the first time I found sensitiveness to percussion in one of the bicuspids. I suspected a dead pulp, as it contained a gold filling of fifteen years standing. A few days more showed marked periostitis. From a bite upon sheet wax I found the tooth receiving hard knocks from a hard, unworn cusp of its antagonist. I ground away the hard headed antagonist, and with

instant and permanent relief, and there has been no discomfort whatever since the hypersensitive tooth was relieved of more than its share of pressure.

Four years ago I removed the pulp from a lower molar for a man of about fifty years, and filled the roots with os-artificial and crown with amalgam. Last January he came in saying: "That tooth will have to come out now." He had lost but two or three teeth, and the others showed extensive wear excepting this one. By a bite upon sheet wax I found it to be receiving more pressure than the others; it was a severe case of periostitis, and increasing daily. I ground the tooth so that it scarcely touched, and he remarked, "There, that is all right," and it has remained all right to the present time.

In February last a young man applied for relief. He had lain awake nights, and suffered daily after eating for more than a week. I could not locate the pain, as it was neuralgic in character, but after several days had passed, during which I made four or five examinations, a lower second molar began to grow sensitive to percussion. It had been filled seven or eight years with amalgam, and now showed a cleaner cut through sheet wax than its neighbors. I applied the grindstone cure, and there has been no discomfort since.

In February a man of forty-five who had been unable to attend to business for a week because of a sore tooth, came to have it out. A lower second bicuspid was jumping up and down in its socket, and I at first thought there was alveolar abscess. A further examination led me to think there was not, and that the pulp was alive. I applied the grindstone cure, with immediate relief and a rapid return to health. He was employed in the city treasurer's office, and it was a plain case of unequal taxation, and the overtaxed member grumbled, as it had an inalienable right to do.

Between two and three weeks ago, a man of fifty, who lives in Chicago, but who was spending a few days in our city, called and wished me to examine an upper second molar. It had troubled him a good deal for three or four years. He had thirty-one teeth, all nearly sound, three or four small fillings in them, and an amalgam filling on the posterior side of the troublesome one. The wisdom tooth back of it had been extracted about four years before. He said it was not sensitive to heat or cold, but most painful after eating. His dentist said he could do nothing except to extract it. I found the filling per-

fect, the tooth otherwise sound, and the gum apparently healthy. I ground it and its antagonist some, and requested him to report the result. I have not seen him since, but a week afterward received a postal card saying his tooth was all right, and that he had had no pain since the application of our specific.

Some three months ago a lady began troubling me with complaints of toothache, for which I could find no cause. The trouble gradually increased until about a month ago, when she came in, saying she had suffered so much that she could bear it no longer, and that cold water gave excruciating pain. With a syringe and cold water I soon found the offender to be an upper second molar, and in which an approximal filling of phosphate of zinc had been inserted a year or two before. The filling was in good condition. I ground the tooth so that it did not cut through sheet wax. I did not see her again until yesterday, when she came in smiling all over, saying she thought it wonderful how such a simple thing had cured her of the "awfulest toothache" she had ever had.

These are only a few of the many cases, but sufficient to show the point I wish to make. We do know that teeth often differ individually in the same mouth in structure and density, with corresponding differences in their ability to withstand wear. As a general rule, however, they accommodate themselves to circumstances, and keep up the balance of antagonism unassisted; yet I have been astonished at the number of cases I have found since I have been looking for them, where a little assistance was needed, and which, when rendered, met the requirements of the case perfectly.



LONGITUDINAL GROOVES IN TEETH.



BY CHAS. E. FRANCIS, D.D.S., M.D.S., NEW YORK.

[*Read before the Dental Society of the State of New York*].

The labial surfaces of canines and incisors, and the buccal surfaces of bicuspid and molars at their cervical borders, are not unfrequently found denuded of a portion of enamel. The dentine underlying, which is thus exposed, presents peculiarities somewhat varied in the mouths of different individuals. In some cases it is of a semi-cartilaginous character and walled by jagged margins of enamel, chalky in color and texture, and when excavated the decalcified structure peeling out in leathery layers. In other cases the dentine becomes discolored, is more dense, yet is

easily penetrated by sharp cutting instruments. Some teeth exhibit smoothly polished furrows running horizontally across their surfaces near the festoon of the gum, as if cut with a file or disc. In such cases the dentine is usually dense and difficult to cut, and the adjacent enamel retains its normal aspect.

Instances occur where these grooves extend far beyond the territorial border of enamel, and deep into the cementum, which is left exposed by the receding gum and absorbed margins of alveolar process.

Occasionally the gums present the appearance of having been worn away by friction—looking compact and exhibiting a healthful glow, while in other cases they are purple and tumid, extending forward or overhanging the cervical line of each groove.

While in many instances these furrows are highly polished and dense, as if the result of much friction, they are sometimes found to be badly stained, suggesting habitual neglect. The teeth of both arches are subject to these lesions and often become seriously injured or quite destroyed.

The destruction of tooth structure is not confined to the adult teeth, but may occur at an early age, the disease first manifesting itself when the tooth brush is used, or by a touch, as with the finger nail near the margin of the gum. Careful examination reveals, at first, a small defect or apparent abrasion at the periphery of the enamel.

Patients ask the cause of this sensitiveness or why these grooves appear? The replies they receive usually accord with the degree of illumination parties thus interrogated possess, and are sometimes rather vague. Opinions concerning the cause of this trouble are somewhat at variance, and text books give it little light. It is said to be the result of chemical action, either of an acid or an alkali. It is also attributed to mechanical abrasion, or too much rubbing with stiff brushes and coarse dentifrices. This latter idea serves as an excuse with some people for suffering their teeth to become loaded with calculus and other mischievous deposits.

Teeth are found grooved, not only on their labial and buccal surfaces, but sometimes are nearly or quite girdled, and the furrows, not unfrequently, are smoothly polished, even in places where a tooth brush would hardly reach—certainly with too little force to polish such channels. It would seem, however, as if surfaces so smooth and dense were marked evidences of attrition, and it is also reasonable to presume that the disturbance was first produced by chemical agency.

The mucoid secretions exuding from the minute follicles around the teeth collect and find lodgment just without the margin of the mucous membrane on their cervical borders. These deposits combine more or less with extraneous accumulations, and being subjected to the heated temperature of the oral cavity will in due time undergo fermentation. Acids thus generated and in direct contact with the enamel hour after hour for weeks, months and years, would naturally tend to impair its integrity, and especially so in low-toned teeth. Parts thus eroded, if exposed to much friction by the use of a brush, would probably become polished; and perhaps even the ordinary movements of the lips or tongue, or the comminution of tough and fibrous food in the process of mastication, would exhibit similar results.

So, Mr. President, it seems to me that there are two agencies at work to produce such conditions as I have attempted to describe.

IMPROVED ARTIFICIAL DENTAL CROWN.

BY A. E. MATTESON, CHICAGO, ILL.

Having used this crown quite extensively in my practice for the past year with unvarying success, I feel warranted in presenting it as worthy of careful consideration.

The following are some of its advantages over others:

The thorough preservation of the root from further decay.

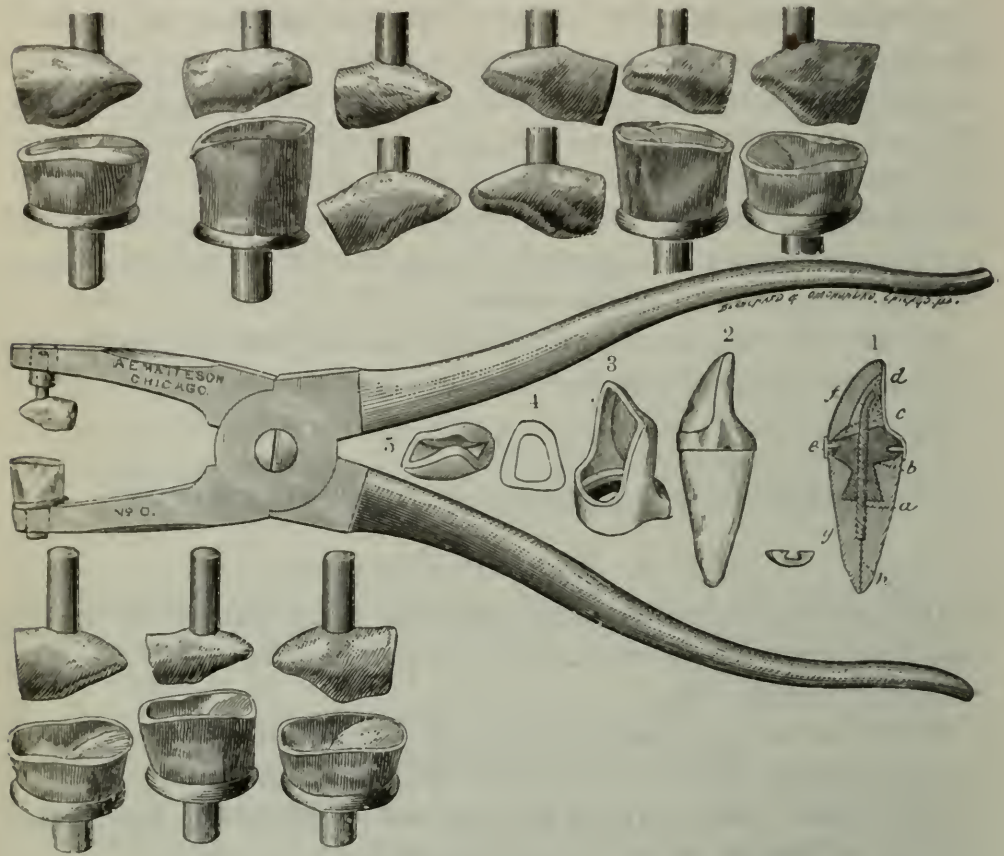
The perfect joint between the root and crown, giving the greatest amount of strength where it is most required.

Simplicity of construction, and perfect adaptation to the end of the root.

The Gold-and-Platinum plate gives the greatest strength without an excess of material, permitting the use of a higher grade of solder than could be employed were gold alone used, without the consequent danger of melting the shell; and being of uniform thickness, its thorough adaptation to the end of the root is rendered a matter of comparative ease and certainty. It also permits the use of amalgam, the strongest cement we have, for anchoring the crown without danger of injury to the gold. I will say however to those who are opposed to the use of amalgam, that gutta percha or any of the cements can be substituted, and with as good results as in any other position in the mouth.

The opening in the front of the shell gives an opportunity to see that the filling is properly introduced and thoroughly condensed, and is not guess work.

The porcelain front is not dependent upon a few small pins for support, but upon the dovetailed slot, further supported by the edges of the shell which entirely surround it; and in case of fracture, a new front can be easily inserted without removing the shell.



Of no small importance is the ease with which this crown can be made. Even in the hands of those unaccustomed to metal work, good results may be obtained.

The forceps, with a set of eleven dies and counter-dies, are all that are required in addition to the instruments usually in possession of a dentist in practice.

DIRECTIONS FOR MAKING AND MOUNTING.

The root upon which the crown is to be mounted should be placed in a healthy condition, with the nerve-canal filled at the apex, the end ground off *below* the free margin of the gum in front, and within an eighth of an inch of the gum on the inner or lingual surface, the end of the root counter-sunk, and the nerve-canal enlarged sufficiently to receive a platinum wire—No. 18 or 20, standard plate gauge—with a screw thread cut thereon. This should fit tightly enough to take firm

hold. Further enlarge one-half the length of the nerve-canal with a cone shaped bur, with its base toward the apex, as represented in Fig. 1.

Previous to grinding the end of the root *below* the gum in front, with fine binding wire, take a measurement of the circumference of the root, at the margin of the gum. Cut across at intersection and carefully remove the wire ring thus formed, without changing its shape. Take an impression of its form, by placing it between a sheet of writing paper and a smooth surface, and by rubbing the end of a finger thereon, the outline will appear. This is the outline of the end of the root; from this cut a pattern.

Dissect the gum from the end of the root up to the alveolar process.

Select a die similar in shape to the tooth you wish to reproduce. Make a pattern of the shell, by pressing between the dies a piece of pattern tin, leaving an opening in front, with a band extending around in front, as represented in Fig. 3, the cut being on a line with the edge on one side. Remove this pattern and press into as plain a surface as possible.

Cut the Gold-and-Platinum plate to pattern, making it wider or narrower, as the wire measurement of the end of the root compared with the pattern indicates. Anneal and place the plate in the same position between the dies as that previously occupied by the pattern; and press into form, remove, bring the edges together without lapping, and solder with pure gold. The shell may be made longer or shorter, wider or narrower, than the die upon which it was made, as the case demands.

To fit the shell to the root, trim the root end of the shell until it occupies its proper position and the articulation is correct, which is determined by the patient closing the teeth. The corners at the cutting edge and sides should be cut, and the edges brought together without lapping, and also soldered with pure gold.

Now, from platinum plate No. 28, cut the ring, Fig. 4, to the paper pattern. This forms the shoulder within the shell (the opening in the ring may be cut out with a plate punch). Place the shell in position on the root (the teeth closed), insert the ring, which should rest upon the end of the root midway the width of the band in front, and should fit the shell tight enough that both can be removed without changing their relative positions. Remove from the root, and with a fine camel's hair brush apply borax, finely ground in water. At the junction of the two pieces, place a small piece of 20 K. solder on the inner surface; i. e., toward the cutting edge of the shell, to prevent an excess of solder flowing between the shoulder and the end of the root upon which it will

rest. Flow the solder, which should merely tack the ring in place at the front. Try upon the root to make sure of its being correct; remove, and complete the soldering. The shell may be strengthened by flowing inside a lower grade of solder than previously used, at such places as desired.

Select a plain rubber tooth and fit to the opening in the shell (which may be removed for the purpose), and with corundum wheel and disk, grind a dove tailed slot in the back (see Fig. 5) running lengthwise, and sufficiently deep to permit the platinum screw to extend two-thirds the length of the crown without interference.

To anchor the crown to the root, place the shell in position, apply the rubber dam over it and the adjoining teeth, turning the edges well under the gum. Remove the shell (the dam will remain in position), dry the nerve-canal, insert the wire screw, cut it off the required length, and with amalgam mixed hard, fill around the screw in the root, and covering the end, again replace the shell on the root (the end of the screw should be bent against the inner wall of the shell when the teeth are closed, so as to fall into the dove-tailed slot in the porcelain front, when that is inserted). Continue the amalgam filling, through the opening in the front of the shell, around the screw, and over the shoulder, as represented in Fig. 1; and with oxy-phosphate cement, complete by filling around the wire and in the slot of the front, which is then inserted and pressed into position by the thumb and finger, the excess escaping at the edges. Burnish the edges of the shell around the neck of the root and porcelain front. Instruct the patient not to disturb it for from four to six hours.

In conclusion I will offer some suggestions. The dies are fitted to the forceps with the cutting edges of the teeth turned toward the handle. Be careful that the dies and counter-dies do not get mixed. Preserve the pattern of each die with which it should be left, as it will save valuable time. Apply the flux (borax) only where you wish the solder to flow, and cut the solder in small pieces, using only sufficient to accomplish its purpose.

Amalgam may be made to set more quickly by incorporating gold with the mercury, say five per cent. Foil scraps are excellent.

In case of fracture of the porcelain front, remove the pieces and fit in another, without removing the shell from the root. Cement in as before.

The cut represents the forceps, one-half size. They are one-half

nickle-plated. The dies are full size, nickle-plated, and are interchangeable in the screw sockets.

The gold-and-platina plate is made by sweating pure gold upon a plate of equal thickness of platinum, and rolling to the desired thickness (No. 33 to 35, plate gauge), and can be obtained at the dental depots.

SUBSTITUTE FOR GUTTA PERCHA.

German Patent 20,939, granted to Maximilian Zingler of London, covers the following process:

About 50 kilos of powered copal and $7\frac{1}{2}$ to 15 kilos of sublimed sulphur are mixed with about double the quantity of oil of turpentine or with 55 or 66 liters of petroleum and heated in a boiler provided with a stirring apparatus to a temperature of $122-150^{\circ}$ C., and stirred until completely dissolved. The mass is now allowed to cool to 38° C. and mixed with a solution of about 3 kilos of casein in weak ammonia water to which a little alcohol and wood-spirit had been added. The mass is then again heated to $122-150^{\circ}$ C., until it is thin-fluid. It is now boiled with a 15 to 25 per cent solution of nutgall or catechu, to which about $\frac{1}{2}$ kilo of ammonia had been added. After boiling for several hours, the mass is cooled off, washed in cold water, kneaded in hot water, then rolled out and dried.—*New Remedies.*

HOW, IN A CROWDED PROFESSION, BANGS GOT A START.

The little village of Millbrook was disturbed in its calm serenity by the advent of two new doctors. Now there will be more sickness, people said, for so many doctors must find work to do. From time immemorial Millbrook had never had so many physicians before. Not that three medical men might not be well supported, for Millbrook and vicinity numbered twenty-one hundred inhabitants; and is it not a (social) law of nature that every seven hundred people must support one doctor? Four doctors, however, were one too many, and only the strongest and fittest would survive in the struggle for existence.

Brown and Bangs were the new comers; Brown from the important medical college of Grande Montagne; Bangs from the little *one-horse-power* concern of Campertown. Brown had the most titles. He was an A.B. and an U.D.M.C., the last two letters meaning master of surgery. Bangs had done no good work at college, but had somehow

managed to get through with a diploma in classic sheepskin, and in Latin, signed by ten professors, which hung in his office in an elegant frame. Brown's friends said that Bangs could never succeed, for in medicine, as in *Sabbath-school library books*, it is always the good boy and good student that is rewarded, while the bad boy that shirks his lessons and "slopes" examinations comes to grief. Besides, Bangs' diploma, coming from *such* a school, would be no help to him, while Brown's Grande Montagne diploma would powerfully recommend him to favor. So Brown's friends thought, and so it seemed to Brown. Moreover, it was known to a few that Brown had written a prize thesis of great merit on "Pityriasis Versicolor," which contained some original drawings, and in which the parasitic origin of this cutaneous affection was ably maintained. He had also made some personal investigations, while a hospital interne, of that curious insect the *sarcoptes hominis*, in which the habits and habitats of the parasite were well described. As a therapeutic measure he had proposed the ingenious plan adopted by hunters in the case of wolves, of smoking the little animal out of his haunts by the fumes of burning brimstone applied to the orifice of entrance. There was, however, nothing especially new in this medication (as was very properly pointed out by the faculty), sulphur having been for more than a hundred and fifty years, from empirical considerations, employed against this common pest of mankind. Brown was well grounded in the general principles of therapeutics, but he had not yet learned that while sound theories are very necessary in applying them to practice, you have the whims and caprices of the patient to contend against, and that you never really have *diseases* to treat, but only *sick people*. Symptom-treating, he believed, was irrational; you must seek out the diathesis, and "go for" it; find the point of departure of the morbid phenomena, and attack it, rather than the symptoms, which would disappear with the disappearance of their cause. This is very good theory, but is not to be followed too rigidly. If Bangs had any theory of therapeutics, it was that symptoms are the key to disease, and the physician's highest art is to attend to and treat symptoms. A furred tongue generally requires an evacuant; pain calls for an anodyne; diarrhœa a corrective or an astringent. Bangs had pored earnestly over certain treatises on "Specific Medication," believed a thousand or more unproved and very doubtful statements contained in them, and thought himself on the path of progress.

Brown believed that his services would be in demand, and that he might "select" his patients and patrons. Bangs was willing to take "anything and everything that came along," and improve every oppor-

tunity to "rush in where angels might fear to tread." It was a boldness and an impudence that very often in this misconstrued world give success. To cut short our tale, Brown did not obtain a foothold in Millbrook, and left discouraged in less than six months. Yet he might have succeeded but for two circumstances. Do you wish to know what these were?

He had not been in Millbrook many weeks when, one stormy evening, late in autumn, a messenger came in hot haste for a physician—one of the Wilson's, of Dogtown, ten miles distant. The weather was cold, and the road very muddy. There was a sick child in Dogtown, and the case was urgent. Dr. Grimes would not go on account of the roads, and Clay, the homœopath, had declined for the same reason. Brown, too, declined, when he was informed that the pay was doubtful. He would not expose himself to such inclement weather "with an uncertainty before him." Here he made a grave mistake, as we shall see. Bangs was summoned, and in five minutes time was ready, equipped, and in his saddle. In one hour and ten minutes he had gained the cottage of his patient. It was a case of typhoid fever, and the sick girl had been suffering from a prolonged attack of epistaxis. Bangs plugged the nostrils (he fortunately had a flexible catheter in his pocket) and stopped the hemorrhage. He came the next day and the next, and so on, and the little patient eventually recovered. His brilliant surgical operation of tamponing the nostrils (which never before had been performed in that part of the country) gave him great repute in Dogtown, and henceforth he could claim all the families of that rural district as his. This was an excellent start for Bangs, and one that he well improved. The fever proved epidemic in Dogtown, and that very year Bangs scored one hundred and fifty visits to that distant agricultural settlement. This professional work, at three dollars a visit, gave his small family for a long time a comfortable support.

"Aunt Jane Hopkins," as she was familiarly called, was a spinster of large influence in Millbrook. Brown, who early in his professional career had been honored by being consulted by this mistress of gossip, had severely offended her by making light of the back-ache, the side-ache, and a host of neuropathic troubles. He had recommended a diet treatment for her dyspepsia, when Aunt Jane knew that she needed medicine. He had even called her neurasthenic ailments *hysteriform!* and counselled greater firmness of will.

Aunt Jane gave him up in disgust, and called in Bangs. Here was just the man who could enter into sympathy with her infirmities, and who had a specific for every symptom. She was "doctored" for

"womb trouble," and "spinal irritation" and "dyspepsia," and "liver complaint," and finally got well after taking six different kinds of medicine daily for eight weeks! Henceforth Aunt Jane acted as though her principal mission of life was to sound the praises of her favorite physician. Those who know anything about the elements that usually constitute village society, can well appreciate the benefit that Bangs derived from such persistent advertising among the gossips of Millbrook.

In short, Bangs' bread was soon "battered on both sides," and Brown, as before said, left discouraged.—*Medical Record.*

PREHISTORIC SURGERY.

In a paper read before the Surgical Section of the Fifty-fifth Convention of German Naturalists, Dr. Tillmanns presented some interesting conjectures concerning the state of surgical art in the stone age (*Centralblatt für Chirurgie*, June 23, 1883). He first reviewed the surgery as practised at the present time by people supposed to occupy the same plane of development as prehistoric man in the stone age. Then, from articles found in the caves of the men of this age, he formed his conclusions concerning their surgical practice. Among the people still living in the stone age he reckons the Australians, the South Sea Islanders, and the Esquimaux. Dr. Miklucho-Maclay has given an account in the *Zeitschrift für Ethnologie* of castration and ovariectomy as practiced among the Australians. He states that girls are robbed of their ovaries in order that they may serve as "hetaiva" to the young people. The operation is performed through an incision by means of sharp flints, on each side parallel to Poupart's ligament. The operation looking to the sterilization of men is performed by cutting away the under wall of the urethra from the meatus to the scrotum. This is done by means of a knife formed of a splinter of quartz set in a handle made of the dried sap of an indigenous tree. The South Sea Islanders trephine for injuries of the brain or skull. A T-shaped incision is made through the scalp and the bone scraped away with a splinter of glass. The operation is fatal in about one-half of the cases. In case of recovery the hole is covered up with a thin piece of cocoa-nut shell. If the brain is found to be injured the destroyed portion is replaced with a piece of the brain of a recently killed hog. This procedure is said to promote recovery. The natives of Tahiti possess a large surgical armamentarium, consisting of flints, bistouries made of shark's teeth, sharpened bones, etc., similar to those found in the caverns of the stone age.

They make saws also from shark's teeth. The Esquimaux produce abortion by pressing or striking against the womb with a whip handle. They also use the sharpened rib of a walrus or a seal, which they guard with leather and introduce into the vagina to puncture the membranes.

Much has been learned of the operation of trephining in prehistoric times from the researches of Prunières and Broca. The former found a so-called "rondelle," an oval piece of bone, one and one-half by two inches in diameter, taken from the parietal bone, in the excavations at Lozere. Such "rondelles" were worn as amulets. They were taken from the skulls of those who in life had survived the operation of trephining. Such men were regarded as holy. After their death fragments of bone were taken from about the trephined part and worn as charms. Many skulls showing this treatment were found. The operation seems to have been performed by scraping away the bone with a flint, as the oblique edges in the skull would indicate.—*Medical Record*.

A QUIZ IN PHYSICS.

Prof.—I have decided to have no recitation to-day, but will permit any of you to present for solution any question or problem which would be of interest to the class, and which will illustrate the principles of this noble science which we are studying. We will begin with that gentleman over on the back seat, who is attempting to violate the laws of nature by trying to raise a beard. Is there anything you wish to ask me, sir? Out with it.

Stu.—Professor, why is it that so many persons drown while under the influence of liquor? Is it because liquors are of higher specific gravity than water?

Prof.—I am not aware that such is the case. In fact we read that sailors, when their vessels are about to be wrecked, break open the barrels of liquor and drink a large quantity in order to make their heads swim so that they can float without a life-preserver.

2d Stu.—Why is it then that a man who is two sheets in the wind is said to have a brick in his hat?

Prof.—This involves a psychological discussion, and you will probably take up that subject when you come under Dr. ———'s instruction. It might be explained from a physical standpoint on the ground that the person who places himself in this condition is aware that his head is lighter than usual, and, therefore, places the brick in his hat in order to keep his equilibrium.

3rd Stu.—Prof., why was it that when the prodical son returned, his father went out and fell on his neck? I heard one of the fellows say that it was because it was winter and the ground was slippery; but I differed with him and bet him beer for the crowd that there was some physical cause involved.

Prof.—This is explained on various grounds. Some say that it was caused by apoplexy brought on by the odor of veal stew emanating from the culinary department; while others claim that he stepped on a banana peel which a small boy had thrown on the walk. This illustrates the principle that when the friction is slight, the seat of your pants will assume a position parallel and coinciding with the slippery surface unless the centre of gravity of your body is perpendicularly over the said surface.

Stu.—But Prof., when one is walking down the street and, stepping on a piece of ice, he assumes a position of which you speak, why is it that it has such a strange effect on the facial muscles of the spectators? Surely it is only the result of laws over which we have no control.

Prof.—If you were the party, and the ones who laughed were in the habit of imbibing, I should say that they were pleased to see a face in beer; but if that young gentleman in the corner yonder should fall down real hard, and his fashionably cut pants suddenly be brought with great force against the pavement, I could assign the laughter to an entirely different cause. This also illustrates the elasticity of different bodies, and proves that when the tension of a body is great, a slight blow will cause a rupture in the molecules of the body, and a tear or rent is the result.

4th Stu.—Prof., one of the glee club told me that at the close of the Oratorio Society's rehearsal last week, he politely asked one of the young ladies if he might see her home, and when she declined, he remarked that she was as full of airs as a music box; to which she coldly replied that at any rate she didn't go with a crank. When he reached home he said you might knock him over with a feather. Now, why is it that a man weighing 160 pounds can be knocked over with a feather?

Prof.—From the easy questions which you ask me one would imagine I was teaching an infant class. You are acquainted with the laws of action and reaction. You also know that singers are always blowing about the quality of their high C's or high A's, and bragging about the fullness of their tones. Now, a blow always reacts upon itself, and the amount of force lost in friction being overcome by the weight of a feather, the blow is knocked over. All these little things which occur in our daily life can be explained by the working of physical laws.

If any one has any problem he wishes me to tackle, let him trot it out now, or forever hold his peace.

5th Stu.—Prof., why is it that about this season of the year, the recitation rooms are sometimes so devoid of heat, while coal is selling at \$5.87 per ton; and, assuming that 75 pounds of coal will heat 4,000 cubic feet of air, for 24 consecutive hours, to a temperature of 75° F., the barometer standing at 29.1546 inches, each room might be heated for a sum no greater than each one of us expends daily on cigars at three for a dime, or candy for his best girl.

Prof.—This is a difficult question and one upon which learned philosophers are liable to get bawled. I have considered it carefully, and have decided that it is caused either by the negligence or incapacity of the janitor. One of the other Profs. has told me that in his room it is caused by the cool or frigid cheek of the students who walk up to the board and crib down their examples. In another room, I am sure it is caused by the vacuum inside the Prof.'s head.

Student (in back part of the room, in a low voice), Methinks this is not the reason, else h—l itself would congeal at that approach.

Prof. (who has overheard the remark) Yes, that is so; you all can see that I am not bald-headed from over-study.

6th Stu.—Prof., can you tell me why this class is like the trees in Spring?

Prof.—Yes, sir; because it is green.

Stu.—No, sir; because it is about to leave.

Students march out and slam the door.—*Rochester Campus.*

A GOOD "SUGGESTION."

As Correspondent to this body I have little that is encouraging to report, as I have been unable to secure anything like a regulated or consecutive series of correspondence of the various bodies who elect such officers. I have much interesting matter in a general way, as one of the members of the general body, that might be wrung in as a report of your Correspondent; but I regard this as rather doubtful as to expediency, as we are warned that our season is so short as to be confined to two days, when we have so much other matter to engage our attention. I will venture, however, a suggestion.

If a series of questions were presented to the corresponding secretary of each State and local society of dentists, there might come out of the answer given by the various persons addressed, a mass of information

for correlation into a syllabus of instruction, as to opinions and proved method of use of the various remedies commonly resorted to by practitioners of different localities, which might become a guide to teachers and learners. As previously hinted, I have not been able to engage other than personal interest in the way of correspondence with society men.

It is my deliberate conviction that if some society would appoint a live committee to prepare a method of procedure and have it embodied in a circular, that it would set the ball rolling in a new and vigorous manner, and we should realize an unheard of progress by thus interchanging our views.—ATKINSON, *Transactions of the Dental Society of the State of New York*.

THE KICKER AND THE HOPPER.

A Kicker known to the world at large as *Stubbornus* attended a strawberry festival one evening at which some grass-hoppers acted in the capacity of brass band. The auditor, with whose hind legs it is dangerous to meddle, remarking that it would be more proper were the performers called a "grass-band," asked where they obtained their talent for music.

"Well," replied the hop-gatherers, "we played croak-ay for several seasons and fed on nothing but dew."

"Nothing but 'do'?" Well, my master is so confoundedly poor that I have fed on nothing but 'do' all my life. As for croquet I never played that at all. I do n't even know how. Where shall I learn?"

"Ask Jupiter."

"All right. Let us bray!" replied the beast with a sickly smile, as he sought his early grave. The *post mortem* examination showed that he died of bray-in' fever, brought on by an excess of humorousness.—BANGS, *Life*.

TO DEODORIZE IODOFORM.

Several new methods for this purpose have recently been published. Here are some of them:

1. Carbolic acid, - - - - - - - 1 part.
- Iodoform, - - - - - - - 2 parts.

Powder, and mix well.

No change seems to take place in the iodoform, but the odor is entirely, or, at least, considerably, masked by that of the carbolic acid.

2. Iodoform,	-	-	-	-	-	-	-	100 parts.
Oil of peppermint,	-	-	-	-	-	-	-	5 "
" neroli,	-	-	-	-	-	-	-	1 part.
" lemon,	-	-	-	-	-	-	-	2 parts.
Tincture of benzoin	-	-	-	-	-	-	-	2 "
Acetic acid	-	-	-	-	-	-	-	1 part.

Powder the iodoform finely, and mix intimately with the other ingredients. Transfer to a well stopped flask, and keep at a temperature of from 120° F. to 140° F. over a water-bath for two days. The mixture, when finished, has a pleasant odor of Eau de Cologne.

3. Camphor,	-	-	-	-	-	-	-	5 parts.
Charcoal,	-	-	-	-	-	-	-	10 "
Iodoform	-	-	-	-	-	-	-	15 "

Powder, and mix intimately.

The above mixtures are used daily by Dr. Gillete in his practice at the Bicêtre Hospital.—*New Remedies.*

NOT IN FAVOR OF ATTEMPTS TO VARY THE SPECIES.

An Irishman dropped into a saloon, and was very much taken with a parrot which hung in a cage near the window.

"Phwat is that?" he asked. "That's a parrot, Pat," replied the vender of stimulants.

Just here the parrot chimed in with :

"Yes, I'm a parrot, and you bet I'm h-ll."

This so delighted Pat that he offered to buy the bird.

"Pwhat'll ye take for it?" he asked. "Fifty dollars."

"Howly Moses! that's too much. Have yez any eggs?"

The saloon-keeper saw a chance for a joke, and answered, "Yes."

"How'll ye sell 'em?" "Two for \$5.00."

Pat pulled out his pocket-book and deposited the amount named. The saloon-keeper took it and went into a back room, from whence he soon re-appeared with two large eggs, which Pat pocketed and walked off. Nothing was seen of him for about two months, when one day he came in, and leaning over the counter, whispered to the saloon-keeper :

"I wants to speak to yez a minute." "Well, fire ahead."

"You'd betther be after watching that burrud of yours."

"Why, Pat?" "Well, from the experiance wid them eggs, I belave the craythur's been associating wid a duck."—*Cincinnati Enquirer.*

SCIENCE AND POLITICS.

It would seem that there must always be trouble between the government officials and the scientists in government employ. Commodore Wilkes succeeded in destroying a large number of the specimens collected by the U. S. Exploring Expedition; Commissioner Watt had difficulties with Professor Parry, the able botanist; Mr. Leduc compelled Professor Riley to resign the position of U. S. entomologist; last winter the papers were filled with accounts of the difficulties existing between the officers of the navy and the civilian astronomers of the U. S. Observatory; and now Mr. Collier, the chemist of the Agricultural Department, has been summarily discharged without any justifiable reason. So far as we can judge from the published accounts, in each and every one of these instances the unscientific government officials are or were in the wrong.—*Exchange*.

CONDUCTORIAL.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

For what appears to be a good report of the doings of this body, see the *Dental Cosmos* for September.

We comment a little: Hayhurst, of New Jersey, said: "The New Jersey board has been very desirous to have the power to confer the degree of Master of Dental Surgery." A committee appointed to secure the necessary legislation failed in its object. He said also—"The same effort will be again made." We sincerely hope the New Jersey board will quench its desire for such legislation, and that the prospective effort in that direction will end as did the first. We say this in the interest of New York, believing that a good thing is worth keeping.

Rehwinkel said: "In New York the degree of M. D. S. is granted by the State Board of Censors." And again: "New York gives its State Board the right to confer a title." Cushing said: "New York permits its board to confer a distinct title, M. D. S."

It may be the same in effect, but the following would be nearer the fact: The Dental Society of the State of New York (and not its Board) confers the degree of M. D. S., through its president, in open

session, and upon the recommendation of the Board of Censors. If any one present, member or non-member, knows of anything against a passed candidate—anything not properly subject-matter for the Board of Censors—he is privileged to speak out, and in so doing force the society into re-committing itself to or committing itself against its avowed principles. That has never been done—and never will be, if “plucking” is practised in the future as it has been up to the present.

Lewis said in answer to Chappell’s statement that the adoption of the third resolution would shut out New York and other states: “We cannot afford to let down the bars in this matter.” We can imagine but one thing at all likely to happen if this were done, and that is, that the boards already in the National Association of Dental Examiners might get out. Of course we do not know how it is with other states not now represented; but of New York it may be safely said that if she ever enters the National Association of Dental Examiners, she will do so on terms perfectly satisfactory to herself.

McElheny said: “We, in Georgia, do not recognize the New York degree as of any more value than our certificate.” A clear case of “States Rights.” Again: “If an M. D. S. came to Georgia to practise, we should put him through an examination.” And until Georgia’s certificate is recognized by New York’s Board of Censors, dentists coming from that quarter may look forward to a similar experience. He said also: “If he had the degree of D. D. S. he would not have to pass an examination.” Then the Wisconsin Dental College, a regularly chartered institution—an institution, by the way, whose legal right to confer the degree of D. D. S. is as good as that of any other dental college in the country—may send its graduates into Georgia without a thought of their being molested.

Or does the Georgia law give the Board of Examiners the right to pass upon the credentials of the D. D. S., rejecting him if his degree is from a disreputable institution? It may not be generally known that New York’s Board of Censors possesses this right, but that is the case nevertheless.

The same gentleman also said, as did Williams before him: “Perhaps it would be better to ‘recommend’ rather than ‘insist.’” We think it would have been very much better.

Thus endeth the chapter.

DISTRICT SECRETARIES.

The following is a correct list of the Secretaries of our district societies. I. James E. Dexter, 8 East 34th street, New York ; II. John J. Pitts, 191 Clinton street, Brooklyn ; III. A. M. Wright, Troy ; IV. A. C. Rich, Saratoga Springs ; V. G. L. Curtis, Syracuse ; VI. E. D. Downs, Owego ; VII. J. S. Walter, Rochester ; VIII. C. B. Butler, Buffalo.

DENTAL SCIENCE CATECHISM.

LESSON I.—DENTAL EDUCATION.

What place is this ? This, my son, is Falls Niagara, and this palatial edifice we are now in is the Hotel International, fronting you may see on the Street Main.

And are all these men clergymen ? None of them.

What then ? Dentists.

But they look distinguished ? Yes, all dentists who come here do.

What are they here for ? To hold a meeting.

What meeting ? The annual meeting of the American Dental Association.

And what is that man doing ? Talking.

What is he saying ? Nothing.

What does he think he is saying ? He thinks he is discussing dental education.

And is he educated ? He thinks so.

Are those who are listening to him educated too ? Some of them.

And do they know as much about dental education as he does ? More.

Then why do they listen ? Because they are both polite and charitable.

Why polite ? Because they are educated.

Why charitable ? Because they know from past experience that it does the speaker good to talk like this once a year.

And does he talk on this subject but once a year ? That's all.

And will he speak on it again next year ? Yes.

What will he say ? Just what he said last year.

What did he say then ? Just what he is saying now.

But will not he study the subject during the year in the expectation of presenting something new at the next meeting ? No.

Why not? Because like most of us he works for his living and has no time for study.

But do not mental and manual labor go hand in hand? Sometimes.

Then that is not the case with all who discuss dental education? No.

Why not? Because their names are neither Levi nor Oppenheimer, Vanderbilt nor Gould.

What do you mean by that? That they are not of the "chosen people."

What is gained then by this annual discussion of dental education? Nothing.

And how will it end? Like many another discussion.

How's that? In wind.

But ——? Sh! It's coming this way.



COMMITTEES OF THE DENTAL SOCIETY OF THE STATE OF NEW YORK.

Of Arrangements—W. F. Winne, E. C. Baxter, F. L. Ames, Albany.

Of Publication—J. Edw. Line, F. French, Rochester; C. Barnes, Syracuse.

Of Ethics—C. F. W. Boedecker, S. G. Perry, New York; C. F. Rich, Saratoga.

Of Business—M. E. Elmendorf, A. H. Chapman, Brooklyn; F. B. Darby, Elmira.

Of By-Laws—J. J. Pitts, Brooklyn; C. K. VanVleck, Hudson; J. H. Holly, Warwick.

Of Prize Essays—C. E. Francis, W. A. Bronson, New York; A. H. Brockway, Brooklyn.

Of Dental Law—Wm. Carr, New York; C. Barnes, Syracuse; A. M. Holmes, Morrisville.

Of Dental Practice—J. G. Ambler, New York; S. B. Palmer, Syracuse; B. Rathbun, Dunkirk.

Of Transactions—O. E. Hill, Brooklyn; E. P. Brown, Flushing; A. N. Priest, Utica.

SPECIAL.

On Diagram of Incisor Tooth (continued)—Frank Abbott, C. E. Francis, S. G. Perry, New York.

On Codification of Dental Laws—N. W. Kingsley, J. E. Dexter, F. Abbott, New York.

SAT ON.

When the chairman of the "Section of Physiology and Etiology" had read his report and announced (as other chairmen before him had done) that there were no papers before the section, we made haste to get on our feet, and then, in a voice choked with emotion, called the attention of the Association to the fact that there was one paper in the hands of the chairman of the section which he would read on certain conditions. We then read from the amended constitution and by-laws, and offered the following:

Resolved, That Section 6, Article V, be suspended so far as the following paper concerned, which it is the author's desire to publish immediately and in a journal of his own election: "An Examination into the Conditions of the Teeth of Certain Prehistoric Races," by W. C. Barrett, M. D., Etc.

According to the *Buffalo Courier* "the discussion was exciting"; according to the *Missouri Dental Journal* it "raised quite a hubbub." When the discussion had gone far enough to determine the fate of the resolution if pushed to a vote, we withdrew it, and all at once the sea became calm. This was our first withdrawal—and our last. The Association saved a rule; but in so doing lost a good paper, of which it had too few to fill in the time. It did more; it "sat on" us and on our little resolution. Hence, as the merchant said of his unsalable lard, "tierce idle tierce."

MEETINGS.—VII AND VIII.

The Seventh and Eighth District Societies will hold a union meeting at Buffalo, October 30th and 31st. Separate meetings (the semi-annual) will be held by the societies the evening of the 30th. Be there, and don't forget to bring something with you.

THE DIFFERENCE.

The American Dental Association is a wanderer—the Dental Society of the State of New York has a habitation; the Association is not incorporated—the Society is; the Association is not amenable to law—the Society is; the Association is neither known to nor recognized by law—the Society is both known and recognized; the Association has

no status—the Society's is unquestioned; the Association is without a single subordinate—the Society is the head of a system of societies,—the only system of dental societies on the face of the globe. And yet the Association—a body that does not know its own mind long enough at a time to draw an order on its treasurer in favor of the man who fairly won, and was awarded by its own committee, the “Etiology of Dental Caries” prize of two hundred dollars—presumes to lecture the Dental Society of the State of New York. Cheek ineffable!

MISSOURI DENTAL JOURNAL—VOLS. XI TO XV.

We are indebted to our old friend—whom we have seen, heard, read, talked and corresponded with, but who doesn't know us from Adam, except that we are “here and now”—for handsomely bound copies of the *Missouri Dental Journal* for the years '79, '80, '81 and '82. We hope some day to make some slight return. Meantime we wish him the greatest of success, and when he has “made his pile,” a quick return to his chosen profession.

NEW YORK'S DEGREE.

The time may come, and very soon, when the Dental Society of the State of New York will discontinue the practice of conferring the degree of “M. D. S.”; but that it will be discontinued at the instance of a clique, and particularly of a clique of so miscellaneous a body as the American Dental Association, is a notion too ridiculous to be entertained for a moment outside of the conceited ring whose wish that it might be so is father to the hope that it will.

A REACTION.

We have read the headless “special” in the *Ohio State Journal of Dental Science* for September; also the headed one, “Pedler's Twaddle,” and the only comment possible is—bitter, personal, coarse. But perhaps these are merely the external evidences of the editor's convalescence from the long-continued “nervous prostration” mentioned at length under the head of “Apologetic.”

THAT FELLER KNOWS SOMETHIN'.

The *I. P.* says of some of the discussions of the A. D. A.—“Nothing but platitudes,” “really painful at times to see men buffet and belabor their brains,” “their pump perceptibly ‘sucked air’,” etc., etc. Our ecstatic soul! If we could write that way, we’d “go for” the twenty-third annual meeting as the traditional bull came to town—tail up and dust a flying.

COMPLIMENTARY—THANKS.

One of the fathers in dentistry, on receiving a copy of the heavier edition of our July number, felt moved to write us, and this is what he said: “Exteriorly handsome—interiorly full and juicy—*ab ovo usque ad mala*.” And the office imp at our elbow wants to know if it’s good to eat.

READ IT!

For a good thing on the recent meeting of the American Dental Association, read the leading editorial of the *Independent Practitioner* for September. The only criticism we have to make is, that the writer does not express himself quite as he could—in truly red-headed style. His attempt at apology for what he does say is uncalled for—anything less would have failed utterly to meet the expectations of the friends of the A. D. A.

“CONGRATULATIONS.”

“The ODONTOGRAPHIC JOURNAL is to be congratulated on its final escape from a sea of ‘Protoplasmic Motion,’ that at one time threatened to prove boundless.”—*Ohio State Journal of Dental Science*.

“Final?” Not if our translator attends to his business. But stay! Who said anything about “Protoplasmic Motion?” What is Protoplasmic Motion,” anyhow?

THE O. J. AND THE A. D. A.

Friends of the American Dental Association do not need to be told that certain things which may be found here and there in this number have reference, not to what the Association has been, not to what it ought to be, not to what it may become—a body representative of better dentistry; but to the Association as seen at times at Niagara Falls, Aug. 7th to 10th—a body representative of dentistry as it exists to-day in Podunk and Scamptown.

TRANSACTIONS.

Transactions—Walking in one's sleep.

Answers to requests to revise manuscript and correct proof: A. "Didn't say it." B. "Never said anything of the kind. Cut it out." C. "Have been credited with a great many foolish things which I never said. Glad of the opportunity to suppress this. Thanks." But he didn't suppress it.

One member squeezed his muse for an answer, and with the following yield:

"Twisted!" it is all twisted, uncouth and awry!
But take it dear friend and make it a boil, stew, or fry;
The MS's. are old, musty, and dry
Enough to make a modest imbecile cry.
——— has cut *his* most woefully too,
And we all are like babes, in a grand boo! hoo!!

The transactions of '82, of the Dental Society of the State of New York, are complete, but will not be distributed until the transactions of '83, now in press, have been advanced to the same stage, when both years will be bound in one volume and issued to members of the State and District organizations.

ASSOCIATION NOTES.

The discussion of dental education was remarkable for its puerility.

Quite a number of the "high joints" of the profession were there, also some "joints" not so high. We were there.

Atkinson said — "If a religious man you should brush your teeth, and urge others to brush theirs—honestly, earnestly, and (the lower teeth) *upwardly*."

Richardson, of London, was accorded the privileges of the floor. He responded very pleasantly and was applauded. "By Jove, but that's good. Lemon did you say?"

For downright ignorance of dental affairs in the State of New York, those who presumed to discuss them not only "took the cake," but absorbed the whole bakery—bread, oven, and all.

According to Bödecker bacteria are the result rather the cause of inflammatory conditions. Why not make them incidental?

The same gentleman also mentioned tartrate of chinoline as "a beautiful antiseptic."

To scare the very small boy, run at him from behind and say "Boo!" To make the average dental education fiend gnash his hair and tear his teeth, approach him in the same way and hiss in his *long* ear "M. D. S.!"

A few years more of experience and as many revisions of its list of questions, and the National Association of Dental Examiners may begin to entertain the notion of conferring a degree. Perhaps the "M. D. S." would fill the bill.

Harlan doubts the efficacy of prevailing methods (Riggs' included) of treating pyorrhea alveolaris. He uses iodide of zinc after excising the dead bone and cleansing the pockets, and as a germicide gives peroxide of hydrogen, H^2O^2 , the preference.

The crowners secured all the time they could, talked themselves dry, got in their work, and then went inquest of something more plastic. What they said would have proved more interesting if it hadn't been heard before, and under more favorable circumstances.

To discuss dental education before the A. D. A., is to attack the Dental Society of the State of New York, a performance that affords the "class-meetin'" members an excellent opportunity to sun their arrogance and display their ignorance. Music is one thing; noise another.

New York's representative was not at the Niagara Falls meeting of the National Association of Dental Examiners—got there a day late. Politicians, who sometimes see a long way a-head, are like poets—born, not made. New York's representative is not a politician; he's a dentist.

Bödecker is after the effects of arsenious acid on the tooth-pulp and their correspondence, or want of it, with the effects attending or following pathological changes brought about by other means. His paper was a continuation of his remarks before the Dental Society of the State of New York, last May.

Pierce told of a patient of his who had been told while on a three weeks visit to New York, that she had "Riggs' disease." "What," she asked, "in heaven's name is that—where did I catch it?"

The same speaker expressed himself as thankful that pyorrhea alveolaris could be discussed without necessarily mentioning "Riggs' disease." Of course there was no sarcasm in this.

Chairman of General Committee of Arrangements—"Here. —, open this bundle."

Chairman of Local Committee of Arrangements—"Open it yourself."

C. of G. C. A.—"It's your business."

C. of L. C. A.—"No, it isn't ; it's yours."

Chorus of members waiting for copies of the Buffalo *Courier*—"Boy-play !"

Hutchinson's "syphilitic" teeth received some very hard knocks. Kingsley said that in twenty-five years of effort to get at what were undoubtedly "syphilitic" teeth, he had failed to find a single case at all characteristic.

In discussing the subject one of the members started out with — "In cases where I have had reason to suspect syphilis in my own fam——ah—oh—I mean my own practice" (much laughter at expense of speaker). He has no family, at least no children.

A (Wise man from the West).—Well, I suppose the next annual meeting will be held out our way.

B (Wise man from the East).—No, it will be held East.

A.—But the question of place hasn't come up yet ?

B.—Yes, it came up last night.

A.—Where ?

B.—On the train from New York.

A.—And was it decided ?

B.—Yes.

A.—In favor of what place, if I may ask ?

B.—Saratoga.

Golden text : Great is Kaukus.

WHAT IS FAME?

The "D. D. S." is in bad repute hereabouts, and all on account of the H. D. Cogswell, D. D. S. fountain in Rochester's "Yellowstone Park." This gift horse has been looked in the mouth, and his teeth found much decayed. In other words, it falls far short of the expectations of those who agreed to accept the gift and give it a conspicuous location. The anti-temperance men are down on the whole enterprise and threaten to erect a beer cow on the other corner, a scheme which, if carried into effect, will leave the fountain wholly to the use of "the faithful dog," so tenderly mentioned in one of the inscriptions.

DIED.

T. L. BUCKINGHAM, M. D., D. D. S.

Died, September 4th, '83, at his residence, No. 1228 Arch Street, Philadelphia, Pa., Thomas L. Buckingham, in the 68th year of his age.

The above announcement will surprise Prof. Buckingham's many friends, especially those living remote from his home, who both heard him speak and visited with him at Niagara Falls last August. To those who met him annually only, he looked quite as well as before for several years, and expressed himself as feeling much better than for some months past. But it seems this feeling was but temporary, for on his return to Philadelphia he began to fail rapidly, and continued to do so till September 4th, when he died.

Prof. Buckingham's early life was spent in mechanical and mercantile pursuits until his twenty-seventh year, when he took up the study and practice of dentistry, soon becoming proficient in pretty much all that was known of it at that day. It was about this time that he removed to Philadelphia, where he graduated in medicine and became interested in dental organizations. His first contributions to dental literature were to *The Dental News Letter*, beginning October, '50, and at the solicitation of the publishers. He was one of the original faculty of the Philadelphia College of Dental Surgery, the charter of which was obtained and an organization effected in '51. When that

institution was merged (in '56) into the Pennsylvania College of Dental Surgery of to-day, he continued with the faculty till his death, thus making him the oldest continuous teacher of dentistry in the States, perhaps in the world.

His pupils in chemistry will recall the simple, straightforward and familiar style of his lectures ; the off-hand manner in which he disposed of things which, otherwise stated, were calculated to discourage rather than reassure ; and the dry humor that ever came to the surface when a statement or experiment would warrant the innovation. Simple in his tastes, methodical in his habits, thorough in everything, ingenious, skillfully manipulative, of good business habits, kind, fatherly, he will be remembered and mourned, and his memory revered, by thousands who regarded him with more than the profoundest respect.

OLD PRACTICE AFTER ALL.

The following gives credit to whom credit is due :

Philip Doddridge (1702-1751), spoke of nerve-stretching, and recommended it as a religious stimulent in his *Zeal and Vigor in the Christian Race*.

"Awake my soul: STRETCH EVERY NERVE.
And press with vigor on."

PELLETS.

Rather late to ask, but how do you like the cover ?

One of the funny men of the press says : If the teeth are good the mouth can be worn open with the poke bonnet.

Dr. J. D. White is the only surviving member of the original faculty of the Philadelphia College of Dental Surgery.

Advice from abroad : ' See Venice and die.' Also hear Brignoli sing "Coot py, sweet tart, coot py," after a macaroni dinner.

What's this? This, my son, is a man. What's his occupation? He's a fizziologist. What's a fizziologist? A man who jerks soda.

An exchange says: "Neuralgia" is the name borne by a charming girl of Iowa. Her mother found it on a medicine bottle, and was captivated by its sweetness.

Even musicians fail to make good their escape: Rubenstein has lost nearly all his teeth, but as he knows how to play with his fingers he may still be called a great artist.

Plug, *n.* In dentistry, a filling; in canal marine, a wind-broken horse; in telegraphy, a thing that tries to fill the place of a striker. Verily, much familiarity doth breed despise.

Before going back on zinc as a suitable material for dies, read Dorrance's article on "Zinc Dies for Swaging Plates," in the June number of the *Ohio State Journal of Dental Science*. "That settles it."

The *American Journal of Dental Science* has encroached upon the cover rights of the *Dental Register*. To distinguish the one from the other it is now necessary to *read* the title, where before the color of the cover answered the purpose.

How to supply the system with phosphorus is the question now agitating some contributors to dental literature. Simple enough. Eat fish; for is it not written, "Fish furnisheth phosphorus to the brain and enhanceth fecundity?" Tim. X, 16.

The *Independent Practitioner* publishes a "Dental Calender" in its August number that seems to be very nearly complete. It rests with Secretaries to keep it up to date. The *Dental Register* has discontinued its calender, substituting a good advertisement.

We stated in the July number that Bædecker had moved from 54 to 60 E. 58th street. This is not the case. He is still in the same *house*, but the *number* has been raised as above by the city authorities. Number different, house "allee samee."

The College of Physicians and Surgeons of New York has sustained a serious loss in the resignation of Dr. John C. Dalton, the well-known teacher and author. He is succeeded by Dr. John G. Curtis, secretary of the faculty and formerly adjunct professor of physiology and hygiene.

Resolved, That, hereafter, dental societies devote a little more time to dentistry, and a great deal less to medicine ; and also

Resolved, That medical men be permitted to practice medicine without further tutoring, especially at the hands of those who are incapable of distinguishing between chronic facial neuralgia and acute belly ache.

Not long ago Philadelphia was visited by a disease that proved fatal in every case—a disease more or less prevalent in other places and which is said to be directly as the population. It is said that in one week fourteen people died of old age, while the deaths from small pox were but three.

Take blonde tresses. I beseech.
Give them a new soda bleach:
Go in where the dentist waits.
Get false teeth and better plates:
Wash that cross eye stenciled so,
Eeny, meeny, mina mo.—*Joslyn*.

Unlike other dental colleges, the New York institution in its late announcement, gives, so far as known, not only the State, but the city address of its graduates. Think of mailing a circular, journal or letter to, "John Smith, Pennsylvania!" Print the city address. If correct it will stand ; if incorrect an order to change it will certainly be forthcoming.

According to late accounts, certain government officials are giving attention to surgery. The New York *Star* says : Americans cannot be too careful now when visiting England. A Philadelphia man reached Liverpool with a boil on his neck, and the custom house officials, suspecting he was trying to smuggle dynamite in it, insisted upon turning it inside out and examining it.

At a meeting held somewhere in New England, it was stated that President Porter of Yale had endeavored to take several of his class through Spencer's "First Principles," and that they had given it up in disgust. The trouble seemed to be with—the book ? or the class ? or the worthy President ? Wonder how they got along with Porter's "Science and Sentiment, with other papers, chiefly Philosophical" ?

The *Independent Practitioner* "goes for" the catalogue style of illustration that characterizes certain late dental books, among them

Webb's "Notes on Operation Dentistry." The publishers, however, put in a disclaimer, thereby shifting the responsibility to the shoulders of the author, they merely furnishing what he called for. It's a most excellent book all the same, and a copy of it should be the property of each and every dentist in the country.

A local paper has the following:—Miss Susan B. Anthony says that there are a thousand women in England practicing medicine, and that so far as she has been able to learn "they kill as large a proportion of their patients and receive as exorbitant fees for so doing as male practitioners do." In view of the opposition which has always existed towards women entering the profession, this is certainly a very encouraging showing.

Man, born of a woman is of a few days and no teeth. And indeed it would be money in his pocket sometimes if he had less of either. As for his days, he wasteth one third of them; and as for his teeth, he has convulsions when he cuts them, and as the last one comes through, lo, the dentist is twisting the first one out, and the last end of that man's jaw is worse than the first, being full of porcelain and a roof-plate built to hold blackberry seeds.—*Burlington Hawkeye*.

The first annual announcement of the Medical Department of the Nebraska State University, informs the reader of a mixed faculty, allopathic, homeopathic, and specifically eclectic. It claims to be backed by State and Federal collateral, and is thus enabled to give students a two years course of instruction at fees as low as the lowest: Tuition *gratis*, anatomical material *at cost*, matriculation *three* dollars, graduation *five* dollars. A sort of God-send to the ambitious but impecunious young man.

Materia Medica.—Young lady passenger to old gentleman passenger who doesn't like dogs: "Why, sir, this dog is a real Peruvian." "Yes, Miss, not excepting his bark." And this —

People who are in fear of death should try O-live oil. It is known that the cod-liver long time on that.

Anatomy —A western paper says: "Sam. Weldon was shot last night in the rotunda by Henry Parsons." About the worst place a man can be shot, next to his heart, is the rotunda. It invariably proves fatal.

Hygiene.—A Montana belle, says the Bismarck *Tribune*, being asked by a Bismarck man if they possessed any culture out her way, replied: "Culture? You bet your variegated socks we do! We kin sling more culture to the square foot in Helena than they kin in any camp in America. Culture? Oh, loosen my corsets till I smile."

CORRECTION.

Our attention has been called to a typographical error on page 49, fourth line from top, where the particular reader may change "public" to "pubic." To some of our readers (including our informant) the change will make no difference—to them it's the same thing.

MICROSCOPICAL.

Mr. H. F. Atwood, President of the Rochester Academy of Science has been elected a Fellow of the Royal Microscopical Society.

The next meeting of the American Society of Microscopists will be held in this city, in August, '84. Members of local societies are beginning to—loosen their purse strings.

POSITIVE COPIES OF DRAWINGS.

Suitable paper is coated with a two-per-cent solution of bichromate of ammonium, to which a little grape sugar has been added, and dried in the dark. The paper containing the drawing is laid upon it and exposed to light until the prepared paper has assumed a gray color. It is now dipped into a one-per-cent solution of nitrate of silver, one-tenth of the volume of which consists of acetic acid. The positive image developed thereby consists of bichromate of silver, which becomes dark-brown on drying.—*Exchange*.

BOOKS, PAMPHLETS, PERIODICALS.

A TREATISE ON ARTIFICIAL CROWNS; HISTORICAL AND DESCRIPTIVE.
By James E. Dexter, M. D. S. Reprinted from the *Dental Cosmos*.
Ph. 39.

Historically interesting, descriptively complete and to the point, fully illustrated, and a necessity to the man who does not care to invent the same thing oftener than the hundredth time.

PEARSON'S DENTIST'S APPOINTMENT BOOK. Kansas City: J. L. Brewser, Jr.

A very neat and convenient book. Our copy has our name stamped in gold on the cover. The publishers have our thanks.

AN ILLUSTRATED CATALOGUE OF MEDICAL WORKS. New York: D. Appleton & Co. Pp. 83.

A CATALOGUE OF MEDICAL PUBLICATIONS. New York: Wm. Wood & Co. Pp. 83.

THE ODONTOGRAPHIC JOURNAL.

VOLUME IV.—*Jan.*, 1883.—4.

ELEMENTS OF ART IN THE PRACTICE OF DENTISTRY.

BY NORMAN W. KINGSLEY, D.D.S., M.D.S., NEW YORK.

[Lecture before the Dental Society of the State of New York.]

At the meeting of the organization of this Society, I accepted the appointment as essayist at this meeting, on condition that I should not be required to name the subject of my paper at that time. My reason for that condition was, that I had in my mind two or three topics which were not in the direction of papers ordinarily addressed to dental societies, and I desired more mature reflection before committing myself to a subject that might not prove the most worthy of the occasion.

With the knowledge that in the multitude of our local societies, dental pathology, therapeutics, surgery and mechanics are being constantly discussed, I have rather chosen to address you upon dental art, a subject to which I have given much thought, in which I have taken an intense pride, and with which I am proud that my name has been honorably connected.

That there may be no misapprehension on your part, and no confusion of ideas where there is so common a confusion of terms, let me clearly define this term of "dental art," as distinguished from dental mechanism.

The respect which the possession of exalted talents has always commanded from those who are less fortunate, has excited the desire for the possession of the name, even without the genius to support it.

The terms art and artists have been appropriated by almost every calling to which man devotes his attention, from the cutting of marble to the cutting of hair, from the painting of portraits to the painting of signboards.

Under the term arts, when speaking of the arts and sciences, we commonly include all the mechanical or useful arts, together with the

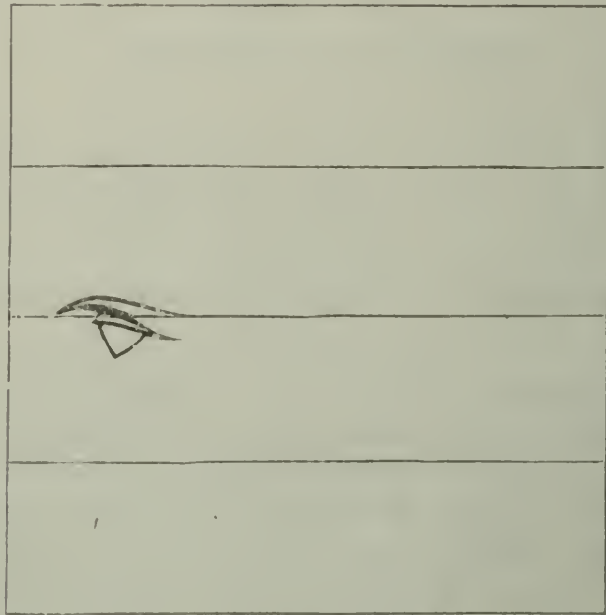


Fig. 1.

fine arts. In fact, everything that ministers to the physical or intellectual comfort of mankind is included in the general term of the arts, and would embrace the washing of your linen and the preparation of your food, as well as making your shoes or manufacturing a steam engine.

In this broad sense, music, poetry, painting, sculpture, architecture, dancing, oratory, medicine and surgery are, equally with the former, arts. In this broad sense, every operation in dentistry is an art.

The distinction, therefore, which I would enforce is the old one, existing between the mechanics arts and the fine arts. All that contributes to the physical comfort and the utilitarian progress of mankind, we class

as mechanic art; all that ministers to the æsthetic sense, furnishing food for the imagination, belongs to the fine arts.

For my present writing, therefore, I shall place dental art under the latter division, and shall admit only such operations as entitled to this rank, as can be said to minister to this higher and finer sense. All other operations are appropriately class under the head of dental mechaicism.

Let me give you a forcible illustration. It is very easy for you to conceive, in this day of cunning workmanship, that it would be possible

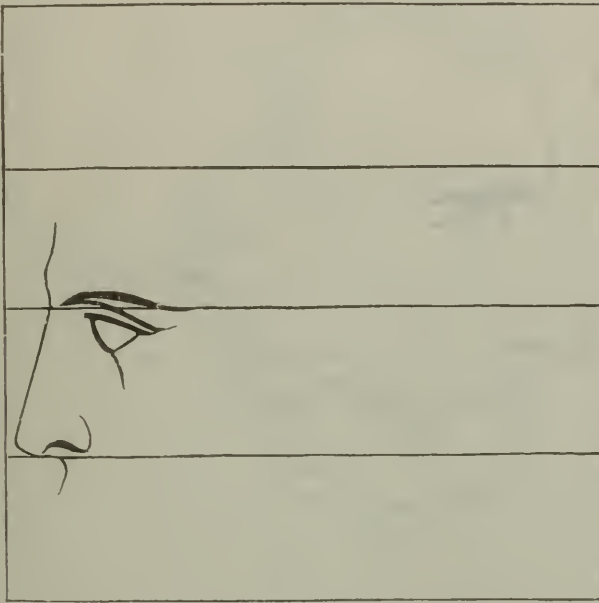


Fig. 2.

to make out of cast iron an artificial denture—teeth, gums and base of the same metal—which should fulfill perfectly all the utilitarian requirements of such an appliance. It would be accurately fitted to the jaw, and admirably articulated with the antagonizing teeth. For comfort in wearing, and for power of mastication, it would be all that was desired, and yet it would not have one element of dental art in its construction. It would be purely a mechanical performance, and come under the head of dental mechanics.

In this sense, therefore, nearly every operation of the so-called surgeon-dentist is simply a mechanical performance, and it becomes supremely ludicrous when men skilled in this specialty, arrogate to themselves higher rank by ignoring the mechanics of dentistry, while never

did they perform an operation that could be lifted above that of mechanics. I am, therefore, as will readily be seen, circumscribing very materially the work of the dental artist, and I do not hesitate to say, that, with rare exceptions, there is not an element of art in the practice of surgical dentistry, and that it is only in so-called mechanical dentistry that a real artist will find any scope for his genius.

To give my remarks a practical bearing, let us trace the process of

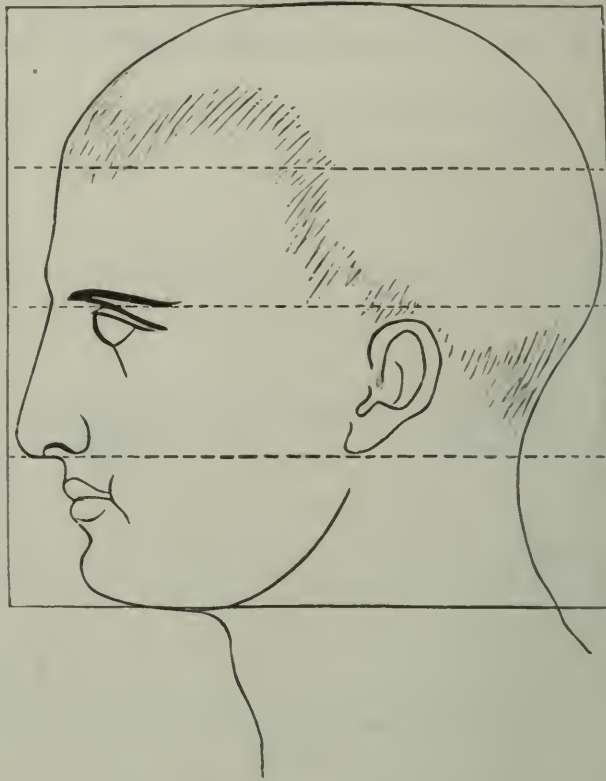


Fig. 3.

making an artificial denture. Taking an impression ; making a model ; making dies ; swaging plate ; fitting plate to the gums ; all these are purely mechanical processes. All this may be perfectly done by one who has no appreciation whatever of the beautiful, of harmonious proportions, colors or sounds.

Supposing now that we are supplying an entire denture for upper and lower jaws, and we are ready to take what we call the "bite." It is of no consequence whether the plates we are using are gold, platina, silver or gutta percha, no one but a true artist can go successfully through the immediate subsequent stages.

Following me therefore, in my imagination, we have presented to us a patient with countenance deformed by the entire loss of teeth, superior and inferior ; alveolar processes more or less absorbed ; wasted and unsupported muscles ; sunken cheeks and lips, and a nose whose cartilaginous portion has lost its hereditary character.

Provided therefore with props, to be placed in the mouth to determine the length of the face, also with some plastic material, of which

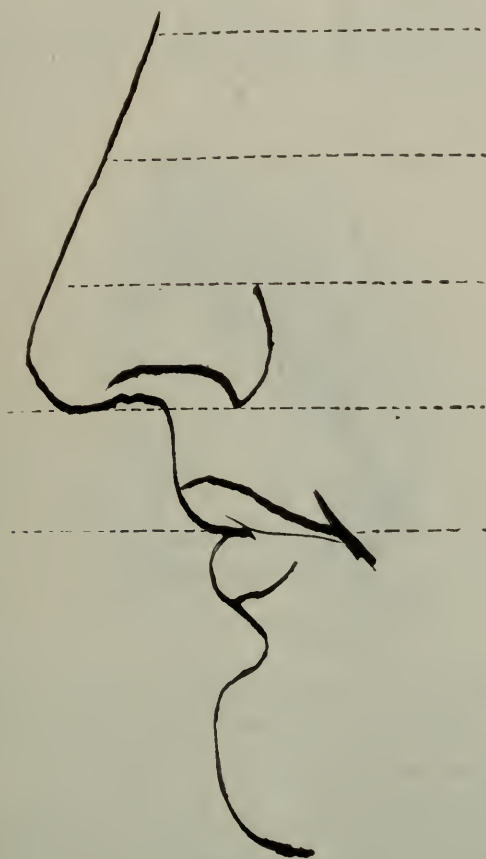


Fig. 4.

nothing is better than common bees-wax, and some simple instrument with which to manipulate your wax, we have all the accessories for the exercise of the highest order of artistic talent.

First, then let us establish the profile. This is not only primary in the order of our works but it is of primary importance. This is the central point around which all our modeling revolves. This becomes the standard which governs all the other features. The profile well chosen, all the other features will be made to harmonize with it, and ac-

according to the profile, will correspond in form, the beauty of all the other features.

No face was ever repulsive where the profile was beautiful ; and no face can be made beautiful where the profile is ugly.

We shall better solve this problem by having some standard of beauty in our minds as an ideal, toward which we are working. Now, this idea of a standard, or typical face, is not a mere whim of the fancy, which allows each individual to select, construct, or adopt, such an one as his refined or perverted taste might choose. but it is one which belongs to a perfectly balanced intellectual and physical head ; one



Fig. 5.

which in its elements and characteristics is often found in nature at the present day ; and one which existed and has been accepted as such from the earliest historic times.

The construction of this ideal head or face is reduced to a system, and governed by a canon, which has remained with but little variations from time to time for a period of nearly 5,000 years.

Recorded in stone on one of the monuments of Egypt is such a canon, which gives the proportions of the entire human system externally, as then accepted.

From that day to the present time there have been proposed probably more than a hundred systems ; nearly every artist of renown, from Polycletus, Michael Angelo, Leonardo De Vinci, down to our living Americans, Page and Story, who have suggested their slight variations. But through all this criticism the proportions of the

individual features of the face and head have remained substantially unchanged.

I propose to draw here in your presence, according to this system, a head which we may adopt as our standard, as it has been the accepted standard of beauty by all artists in all ages.

I shall have to ask the pardon of the Society if my remarks partake somewhat of the nature of an address to students, for although I see before me "fathers in dentistry," who have been observers and admirers of beauty all their lives, I dare say but few can designate the elements of facial beauty, or the true relative proportions of the individual features.

Upon this canvas I have drawn a square crossed by five lines, includ-



Fig. 6.

ing four spaces. The head which I intend to outline shall fill those four spaces, and while all of you have been constantly observing faces and profiles, I doubt if any of you can correctly place the eye in the spaces here allotted to our ideal head. So familiar do we become with the objects of every day's vision that we fail to apprehend what we do see. I presume that the general impression is, that the eye is located in the upper part of the head. To one who has not carefully considered it, the eye would very naturally be placed with about one-third of the head above it, and two thirds of the head or face below it; but I shall place it below the middle line; *i. e.*, in the lower half of the head (See Fig. 1). The placing of the eye will serve to impress more thoroughly upon your minds the relative proportions of the features than any other method that I can adopt.

In Fig. 2 we have added a nose, which, you will observe, occupies one entire space, or one-fourth of the head.

In Fig. 3 the drawing is complete as will be seen, by giving to the mouth and chin one fourth, to the forehead one-fourth, and to the head including the hair above the forehead, one fourth. Now we have the outline of a physically well-balanced head.

By a still closer analysis (see Fig. 4), we perceive that the upper lip is short and slightly prominent, in length from one-fourth to one-third that of the nose, the lower lip round and full, but distinctly separated from the chin by a marked depression. This depression must not be overlooked by us; it develops the chin. Fill out this depression, as is often done by artificial dentures, and one of the finest features of the



Fig. 7.

face is destroyed; but retain it when it is natural, or otherwise endeavor to produce, and the beauty of outline is correspondingly enhanced.

Having adopted a standard of beauty, with the relative proportions of the prominent features, let us compare a few leading types with our ideal, and we will make the application of our knowledge to the practice of dentistry.

Fig. 5 is a drawing of the head of the Apollo Belvedere. The statue, as you well know, is that masterpiece of Greek art which has been accepted as a standard of male beauty for hundreds of years. The object of the artist in the representation was to portray the highest type of physical, rather than intellectual beauty, and the character of this god gave him abundant opportunity. The general line of the forehead and nose, you will observe, is the same. In many of the Greek

statues it is a single straight or nearly a straight line, from the tip of the nose to the top of the forehead, and it is this line that forms the distinctive characteristic of the Grecian profile.

But the parts to which I call your special attention are the nose, mouth and chin. None of these features will admit of any material modification without detracting from their beauty.

Fuseli, a celebrated lecturer on art, said: "Shorten the nose of the Apollo by but one tenth of an inch, and the god is destroyed." Observe, therefore, the relation the nose bears to the upper lip, and also the relation of the upper with the lower. The nostrils take the general



Fig. 8.

direction of the mouth. Were they to be raised at their posterior boundary, it would give the face a sneering and contemptuous look, or were they drawn down, it would give a surly and morose expression.

The relative proportions of the features are substantially the same as in the standard we have adopted. Let me sum up briefly the chief elements of beauty: A short, finely curved and prominent upper lip; a full, round but less prominent lower lip, and a strongly marked depression at the base of the lower lip, giving a roundness and character to the chin. The next illustration (Fig. 6), is that of another Grecian divinity, a head Medusa; a strong, powerful character. In many respects it is the most remarkable female head I have ever seen.

Make your analysis of this profile, and you will see that it possesses the same general characteristics; and these characteristics of the lower part of the face, are elements of beauty wherever you find them.

Thus, while at the present day the pure Greek type is very rarely seen, we nevertheless do see, in all handsome profiles, very much the same outline in the lower part of the face that I have indicated above ; the variations being in the upper half of the face, and not in the lower.

I have here a drawing of another type of profile (Fig. 7), one that you will recognize as not uncommon in life.

Indeed, if I were to describe the American type, I should be as much inclined to give that name to this form of features as to any other, it being quite as universal as any other type which is distinctive, and which possesses the elements of beauty.



Fig. 9.

We find here much the same proportion as in our standard, and also developed to a considerable extent, the characteristics of beauty in the lower part of the face.

I present you here another drawing of the same face (Fig. 8), some months after the loss of the upper and lower teeth. You will here mark the beginning of that deformity which it is your duty to remedy.

The mouth is sunken, the lips compressed, the end of the nose flattened, the nostrils drawn down, and the whole line of beauty in the lower part of the face, gone.

It will be interesting to follow this development a little farther ; and I have here another drawing (Fig. 9), of identically the same face, in all the minutiae of detail, except the region around the mouth.

Here is exhibited that wonderful transformation from youth and beauty to age and ugliness ; and all those peculiarities which were no-

ticed in the earlier stages are still more strikingly developed. In this last drawing, which is the size of life,* I have raised the lower jaw so that the face is shortened only the quarter of an inch, and you cannot but be impressed by the effect produced.

You have it now in your power to remodel this face ; and it is very important that you carefully consider whether you can make any greater improvement than simply to restore the features to their original form and position. I think the more you study it, the more certain will be your conclusion that the original form in this case harmonizes better with the upper features, than any change it is possible for you to make.



Fig. 10.

If you had a living model now before you, with these features, and were to experiment upon it, you would probably find that any material variation from the original form, would show a want of correspondence between the lower half of the face and the upper.

I desire now to call your attention to one of the ugly developments of nature, and one in which, when the change we have been considering, and which we call deformity, takes place, we will find but a step toward beauty. The face (Fig. 10), you will also recognize as a type of many that you have seen, and one which, at first glance, seems to have hardly a redeeming feature ; and yet, if you will analyze it, it is only the lower half of the face that is decidedly ugly. In fact, it is only the cartilaginous and movable part of the nose, together with the two lips, which give this beastly look. The forehead is not bad, neither is the chin.

* The drawings shown to the audience were life-size. —Cox.

Let us consider, now, what we will attempt here for improvement. If we fancy that to make a mouth here like the mouth of the Apollo would give beauty to the face, we should find ourselves disappointed. Such a mouth, in conjunction with the other features which we cannot alter, would only be making a deformity of a beautiful individual member. But there is no danger of your committing such an error; you can only manipulate these features to a limited extent. You can depress the lower end of the nose, raise the nostrils, retract and shorten the lips, and shorten and improve the face, by raising and advancing the chin. Supposing, therefore, that when the entire teeth have been lost, and the alveolar process absorbed, we exercise our skill. Instead of attempting to restore the features to their original position, we should study to avoid that, and at the same time should study to avoid the appearance of a sunken mouth.



Fig. 11.

This drawing which I now show you (Fig. 11), will illustrate my meaning. The chin is here raised one quarter of an inch. In this case the advantage is decided; in the former case the same process produced deformity.

Again, it is not always by the absorption of processes and the re-treating of the lips that we get improvements. It is not uncommon to find the upper lip less prominent than the lower, and that, too, when the teeth are fully developed underneath. In such a case it is manifestly desirable, if the free movement of the muscles of the upper lip will permit, to advance it to the line of beauty.

I have here a number of drawings of other faces, differing in a marked degree from those which I have produced; but these are sufficient to

illustrate the principles which I am advancing. I must here caution you particularly to study with great care the movements of the mouth. It is very possible that you may have produced a most desirable change to be observed when the mouth is in repose, but when seen in action, the expression, from overstrained and unduly taxed muscles, is horrid. In modeling, you will, therefore, pay great respect to expression; for a pleasing expression is of far more consequence than a scientifically beautiful outline or contour.

This leads us very naturally to the steps to be followed subsequently to the establishment of the profile. I can in this lecture hardly do more than allude to them. The extraction of the canine teeth, with their long roots, destroys the expression of the face more than that of any other teeth. The roots of these teeth support the wings of the nose, and when extracted allow that feature to be disagreeably drawn down, together with the formation of a deep wrinkle immediately behind it. Your wax model will require in many cases to be carried well up at this point, or this feature will not be restored. But you must avoid making the crown of the canine teeth too prominent. These crowns lie under the corners of the mouth, and there is hardly anything more disagreeable than to see the corners of the mouth strained when in repose, or revealing, when opened, two tiger-like fangs. Be careful, also, that you do not strain the upper lips so that its beautifully curved line is obliterated, and the mouth represents only a comparatively straight incision. Preserve, also, the groove which should indicate the median line below the nasal septum, which is a mark of beauty. With the lower lip, also, use the utmost care that only its edge be advanced, and that it be entirely undisturbed at this junction with the chin, and, if possible, at the corner of the mouth; let the lower lip fall within the upper.

We come lastly to consider the support and consequent form which you will give the cheeks. If all the processes which I have already indicated to you have been skillfully performed, you will find this last comparatively easy of accomplishment. With all the other features in harmony, and only sunken cheeks to fill out to correspond, your labor will be light. But here, too, you will be liable to overstrain them. It is very easy, by overdoing this, to suggest a swollen face, or a disgusting quid of tobacco in the mouth.

In the restoration of the features after the teeth have been for a long time removed, the cheeks and the lips not having been supported meantime by art, both the comfort of the patient and the necessity of

preserving the identity, would suggest that the entire restoration be not accomplished at once. In like manner, when the features are to be remodeled, and the muscles taxed beyond their original development, the change can be made gradually with ease, and without sacrifice of expression. The muscles must be allowed freedom of action, and it will sometimes be quite difficult to permit this, and at the same time give the most desirable form. It will be borne in mind, however, that the muscles can be developed into a use which is not common with them, and certain expectations for the future may be predicated on this fact. In all these efforts the law of harmony must not be forgotten. A skinny forehead, angular eyebrows, hollow eyes and depressed temples, associated with full lips, plump cheeks and a well developed chin, will strike even an ordinary observer as an incongruity. In the study of human faces, the student of nature will find new and pleasing wonders continually; and to carry out the law of harmony, his highest powers of discrimination will be in constant requisition. He will find, to his astonishment, that what might be termed mechanical symmetry is lacking in every face.

So accustomed do we become to the general configuration of the human head, that we rarely if ever view it critically. A close comparison of one side with the other of almost any face, will detect grave departures from uniformity.

A straight line from the center of the forehead to the center of the chin will not necessarily bisect the nose, showing that the median line is not a straight line but a curve.

Neither the eyes nor the eyebrows will occupy the same angle to the median line; one side will be higher than the other, and the same is true of the mouth.

The distance from the corner of the mouth to the outward corner of the eye will not measure the same on both sides.

The horizontal circumference of the skull being ovoid, the face does not occupy the precise front, it being longer from the anterior median line to the posterior median line on one side than the other.

By standing behind a person and looking over the head, thus bringing the face reversed to the eyes, these deviations from mechanical perfection may be more readily noticed. By such observation we may learn that a slight variation in the fullness of the cheeks will harmonize

better with the surrounding features of that side than if both were equally plump.

All artists and physiognomists agree that the mouth presents a greater variety of expressions than any other feature. In portrait sculpture the mouth is the feature of all others for denoting expressions. Neither the eyes, nose, forehead, ears, chin, nor all combined, have the power of conveying that of which the mouth is capable. It speaks, even without utterance, of every emotion of the heart; love, anger, pride, scorn and contempt, equally with joy and sorrow, have their insignia stamped upon the mouth. These changes are so rapid, and their continuance so evanescent, that the phrase "catch the expression," is often used with but little idea of its full signification.

Dr. Holmes says: "All parts of the face, doubtless, have their fixed relations to each other and to the character of the person to whom the face belongs. But there is one feature, and especially one part of that feature, which more than any other facial sign reveals the nature of the individual. The feature is the *mouth*, and the portion referred to is the *corner*. A circle of half an inch radius, having its center at the junction of the two lips, will indicate the chief focus of the expression."

"In cheerful emotions, as laughter, smiling, etc., the angles are pulled upward. In fear, pride, hatred, revenge, disgust, contempt, consciousness of power, the corners of the mouth are drawn downward. The union of so many muscles at the angles of the lips produces that fullness about the mouth remarkable in those who are thin and muscular. In the child or youth whose face is plump they make the dimple in the cheek."*

These various movements around the angle of the mouth require careful observation for their full comprehension, and it must have already become apparent that this knowledge is of vital importance to him who would succeed in the art of dentistry, and that without it the consummation of excellence can never be attained.

In the loss of the teeth, the absorption of the processes, and the wasting away of the muscles and tissues, as we have seen, the greatest possible detriment is caused to the expression of the human countenance.

The complete restoration of this feature, with all of its power of expression, by art—art so consummate in the selection, arrangement and adaptation of its means as to defy detection—is one of the crowning glories of dentistry as an art.

* Sir Charles Bell.

APPRECIATION.

BY W. H. ATKINSON, M. D., D. D. S., NEW YORK.

Mutual acknowledgement and appreciation of attainment is the *sine qua non* to profitable associated effort in any calling, be it educational, professional, artistic or mechanical in character. Assumption of knowledge not possessed and unwillingness to review accepted dogma, on the part of those making the claim, is the chief obstacle in the way of continuous growth in knowledge.

Conferring of degrees and titles grew out of this sort of exclusion on the part of those who had the ambition to be leaders and teachers in private or public capacity. "Rights, immunities, and privileges" "pertaining to this grade" are the advantages conferred on those who accepted the "degree," as nominated in the instrument called a "diploma."

The simple fact that the same formula of attainment is given to all the graduates in any class is sufficient to prove its falsity. Favoritism and enmity too often are elements of success or failure to pass the board by a sufficient number of marks to make the required per cent. No matter how much of an advance may have been made in knowledge, the form of diploma remains stationary, so that there is no distinction between the oldest graduate who barely squeezed through by favor and the richest attainment made by the brighter mind of the close student of new matters in knowledge. If the possession of a diploma is to be the evidence of capacity, it should be so worded as to make it a true exponent of the attainment of its possessor. This would demand each degree to be unlike any other just so long as knowledge is on the increase and formulated statements liable to change so as to meet the demands of new revelations in science.

Were the desire to possess knowledge as strong as is the desire to be appreciated as learned and skillful, there would be less demand for certification and diploma.

Undue estimation of the value of the diploma or certificate has led to cramming, coaching and favoritism on the part of teacher and examiner. These have engendered jealousies and bickerings in institutions of learning between the classes and grades that have never been outgrown.

It was hoped that dentistry was so fresh and untrammelled that its study would be free from these, and a more fraternal and noble emulation take their place in the study and school. This hope, alas, has come to grief, as is but too plain upon glancing over the journals and witnessing the pranks of the M. D.'s, D. D. S.'s, D. M. D.'s and M. D. S.'s, each of whom regards his degree better than the other's.

A good primary school education is a necessary foundation with which to begin study of any kind. Many have been appreciated by a paying clientel who could not read or write correctly. Examples of this class may be found in legislatures and the professions of divinity, medicine and law. These men did not succeed without education; but the kind of school they were in was that of observation and experience.

If we wish to be appreciated at our true value as useful members of a noble calling, let us open ourselves each to the other and to the world, and eschew all double-dealing and assumption of attainment that we are conscious of lacking, and come together in the spirit of kindness and earnestness to grasp the present means of growth in a "live and let live" endeavor, and then we shall be appreciated.



CLEFT PALATE AND ARTICULATE SPEECH.



BY NORMAN W. KINGSLEY, D. D. S., M. D. S., NEW YORK.



[Remarks following a paper read before the Dental Society of the State of New York, on "The Anatomy and Physiology of Cleft Palate," by A. P. SOUTHWICK.]

There is nothing but commendation that I can give to Dr. Southwick's paper. He speaks of the origin of cleft palate being in doubt. The origin of all things is in doubt, but it is quite possible to get a little nearer to the primary cause in some cases than in others. Congenital cleft palate originates about the ninth week after pregnancy. (I hear Dr. Southwick saying he has never been there. He was there but he has forgotten it.) [Laughter and applause.] At that period the tissues which he described as forming two points approximating each other are separate. A week or two later they are united. At the ninth or tenth week the foetus shows a fissure like the fissured palate. If anything occurs to arrest development, and that arrest continues even

for a short period, a congenital cleft palate is the result. You will remember that if the function of development is not performed within the time allotted it, it will remain permanently arrested. If the period passes within which it should have been completed, it never is completed. We see the same law apply in the maturing child. If a child becomes stunted and does not reach the full stature of its inheritance at maturity, at say twenty or twenty-five years of age, there is no hope or expectation that it ever will. The period of development has passed and will not be resumed. It is the same law applied to a brief period of time which makes permanent the fissure in the palate which is seen at the ninth or tenth week.

It is not at all likely that the actual cause of the arrest of function will ever be known. Any solution of it will simply be guess-work. The mother may tell you: "I remember at that time I saw a big dog open his mouth wide," and she was scared; but you will probably find that those things made no marked impression on her mind at the time, and it is not until after the child is born and the cleft palate discovered that she refers to it as a cause.

It is probable that the cessation of development which shows itself in cleft palate has a different existing cause in every instance, but to arrive at or point out such exciting cause and thus forewarn pregnant females would be impossible. The difficulty of obtaining exact testimony after the birth of a cleft-palate infant will forever preclude the possibility of reaching the cause. And so I think it will never be known. The illustration Dr. Southwick drew from the cubs I don't think could with certainty be charged to the diet. I think the same law that applies to the woman would apply to the tigress and her cubs, but I doubt very much whether it was the matter of food. Again, too, the statement that there are no cleft palates among animals in their natural state is gratuitous. We may say we *believe*, because we have not seen any; but we have not seen all the animals. We don't certainly know about that. We may believe, but belief and knowledge are two things.

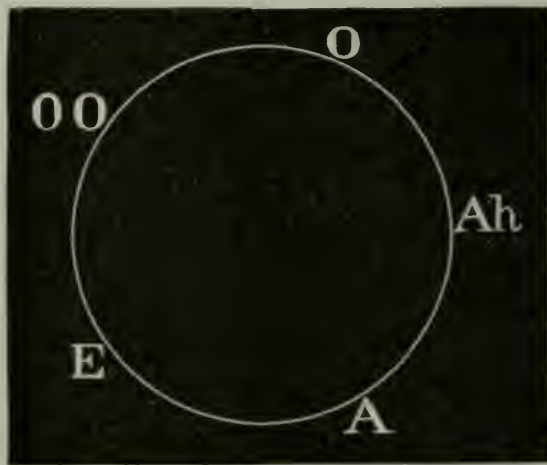
Another point which was suggested by the paper: He was comparing the results of the elastic artificial velum with those of the hard non-elastic obturator. I have been more than twenty years trying to know something about it. Up to perhaps a couple of weeks ago I thought the best result I had ever seen in my life was the result of a soft elastic velum. The patient's speech was as absolutely perfect as mine to you at this moment. There was not a trace of

defect in any way. Patients wearing such apparatus I have submitted to the most critical tests of experts in elocution without the presence of an artificial palate being suspected. I have seen the same in other cases. Not in all, I assure you. So I had come to feel that the elastic velum would produce better results than were possible with any other instrument. But some dozen years ago or so, a gentleman had an elastic velum applied, not by myself, however, and considerable improvement in his speech followed. Some four or five years after that, or eight years ago this summer, he came to me and I told him I believed I could get equally good results by taking the elastic velum away and making a different appliance, and that he would be able to maintain the improvement in speech he had already acquired. I did so and I made the apparatus entirely of gold, and the part that went back in the pharynx was a gold bulb adjusted to conform to the muscular tissues when in action. I had much difficulty in making the bulb so that it would be absolutely tight. Within the last ten days, being out for a moment on a bright, sunny day, and returning, I stepped into the parlor and a gentleman accosted me. The sun was so bright outside that the parlor appeared darkened and I perceived only a stranger. I did not realize that it was anyone I had seen before. A short conversation was held which seemed to me of a mysterious character, and on my showing my want of comprehension he gave me his name and referred to his artificial palate. It was my patient of eight years before, as described. I was never more chagrined at a want of recognition, nor dumbfounded, for his speech was absolutely perfect. I was amazed—I, whose ear was used to detecting even slight defects of speech, could discover no defect. There was sitting in my office chair a lady whose daughter had been under my care for the same defect. The daughter had not made the progress she ought. I said to her, without his knowledge, "Will you kindly sit in the parlor, and within hearing distance? I want you to listen to this gentleman's speech and criticize it." I invited the gentleman into the office for the sole purpose of talking with him. I kept him in conversation five or ten minutes. She, too, was amazed. There was not a trace of defect to indicate that there ever had been any fault in his articulation. That was the result of an obturator, where the other was the result of an artificial velum. And so I say either may produce the best of results; but the results are not always dependent upon the operator, but are in many cases dependent upon the peculiarities of the individual, which are beyond control. So certain people may never acquire absolute perfection of speech with any instrument.

But I had not thought to say as much as this upon this branch of the subject. Dr. Southwick asked me to make some remarks upon his paper, and I had intended to occupy a few moments in calling your attention to some of the physiological peculiarities associated with cleft palates. I doubt very much whether the subject of articulate speech and its mechanism is thoroughly understood by many present. I question whether it is by one in ten. It is a fascinating study to me; a study with much the same charm as that of music to the lover of music.

The physiological and philosophical origin of articulate speech lies in the vibration of the vocal chords which create vibrations of waves in the passing current of air, and such waves reaching the ears of the hearer produce the effect we call sound. Sound and voice may here be used as interchangeable terms. The sound produced by the vocal chords may be one in tone, note and key, but in passing through and out of the mouth it becomes changed by the alterations in the form and size of the buccal cavity. The one note produced when the mouth and the fauces are wide open is the vowel Ah, and all the other vowel sounds which are heard in any language are but modifications of the sound Ah, made as above described.

In the English language we have five distinctly marked vowel sounds, but the division of the one note, Ah, into the five vowels only, is more arbitrary than otherwise. We can illustrate the entire scope and compass of vowel sounds by the accompanying drawing:



By sounding each one of these vowels as named separately and distinctly, beginning with OO and continuing with O, Ah, A, E, and then repeating the same order more rapidly until there becomes one contin-

uous sound, it will be seen that the division into five sections or vowels is entirely arbitrary—a matter of convenience and a concession to unappreciative ears. If our ears were as finely attuned as those of some of the lower animals, this cycle of sound might have fifty divisions or vowels instead of five, but for the general purposes of spoken language distinctions in vowel sounds should be strongly marked, and more than five are not likely to be appreciated. These five sounds, together with interruptions, make up in their almost infinite combinations the whole of spoken language.

The interruptions, or stops, we call consonants, and were it not for the liberal use of consonants any spoken language would be very limited in its scope and expression.

The effect of the consonant is very simply illustrated by sounding the vowel Ah and stopping the sound by shutting the lips; if the vowel is continued on opening the lips, Ah becomes Bah, and in a similar manner all consonant sounds are produced.

Cleft palate patients are generally able to produce the vowel sounds without difficulty, but many of the consonants are entirely wanting, and and with such a fissure it is impossible to produce them. Some of the consonants depend solely upon the integrity of the normal palate, and others even are more or less affected by its rupture.

In many instances so large a number of consonant sounds are imperfect that the speech becomes absolutely unintelligible. It is then that an artificial palate becomes a most beneficent provision. * * *

It would be hardly complimentary to say that I am annoyed from time to time that real knowledge makes so little progress. More than twenty years ago I discovered that the surgical operation of bringing the sides of the fissured palate together, no matter how perfect the union might be, did not produce perfect speech, the reason being that the newly formed velum is too short to reach the posterior wall of the pharynx, and by thus closing the passage to the nares enable the patient to make the defective consonant sounds. There is a lack of tissue or material in the remnants of the palate when cleft to enable surgery to both bridge the fissure and get sufficient length for proper articulation. The surgical palate is too short *and always will be*. I have preached that doctrine over and over again, and when I could get the ear of a scientific man long enough to thoroughly understand what I meant by it, he was always convinced, so much so that in every instance where a surgeon had been sewing up cleft palates he recognized

the cause of failure and abandoned the operation in every case. Not a distinguished surgeon in New York city will operate for cleft palate, because he does not believe he is doing the patient any good.

The name of a certain dentist in New York city has been mentioned, and I mean no disrespect when I say he has been affecting surgery for some years past and has been airing his knowledge, who is particularly anxious to be distinguished as a great oral surgeon, and has undertaken in several instances the utter and egregious folly of performing a surgical operation when a man more cautious would not touch the case. The result will be failure in every instance. A gentleman once asked me: "When do you think the best time to operate on a cleft palate? How early in life would you operate?" I replied: "If I were going to perform a surgical operation at all, I would perform it at birth, and would make it transversely between the head and shoulders."

CASES IN PRACTICE.

BY P. L. STODDARD, D.D.S., PRATTSBURGH, N. Y.

[*Read before the Seventh and Eighth District Dental Societies, Oct., '83.*]

You are aware that odds and ends will accumulate on a cook's hands, out of which is made a dish, more palatable than "tony," called hash. Having been called upon to furnish a paper for this meeting, I was at a loss to decide what title to give my effusion. Not having the time, or the ability, to enter into any scientific research, I thought to make my paper up of odds and ends and call it "Hash," and thus wrote your Secretary; but he, not liking the title, requested me to change it to "Cases in Practice." and so it is in the call; but I still fear it will partake of the aforesaid plebeian dish.

CASE 1ST.—Mrs. —, aged 22 years, advanced to the seventh month of first pregnancy, suffered severely from pain in the lower jaw, which she referred more particularly to the right side, in the region of the wisdom tooth, which had partly erupted. Her family physician called the pain a sympathetic neuralgia, and refused to extract the tooth, saying, it would probably do no good, and might cause an abortion. The

suffering became intolerable and she applied to a dentist, who, in attempting to extract the partly erupted wisdom tooth, pinched off a part of the crown and thus exposed the pulp. This occurred in Illinois, where she still lived only to suffer. Being a native of the state of New York, and believing in the superior skill of her dentists, she came east for relief, and applied to the dentist, who she thought could do all things. The late Prof. James P. White used to say: "If people think you the greatest man in the world, it is not your duty to undeceive them." This man had attended Dr. White's lectures and profited by his instructions, so he told the lady he would consider her case and do what he could. A careful examination revealed the fact, that the tooth had never properly erupted, but lay horizontally along the jaw, with the anterior cusps pressing hard against the posterior root of the second molar. The posterior cusps and back part of the crown had been pinched off in the attempt to extract, exposing the pulp as aforesaid. Promising immediate relief and a radical cure, chloroform was promptly administered, and then the second molar was extracted, the wisdom tooth drawn forward into the empty alveolus and also extracted. The cure was as complete as radical, and soon the happy mother told her baby of the great good man in New York, and I maintain that the fears of the family physician were hypercautious if not groundless, and that the action of the New York man was in the line of duty and right.

CASE 2ND.—The Autocrat of the Breakfast Table says: "It is impossible to tell in many cases whether a thought, idea, or comparison that suddenly suggests itself is a new conception or a recollection." That such is the case I know to be a fact, for once in contemplating a seemingly very difficult case to fill, a plan revealed itself suddenly to my mind, and for a moment I verily believed I had made a discovery—hit upon an entirely new and good thing. Seized with the missionary spirit, I wanted to write it up for the *Dental Cosmos*, then immediately it seemed old, and the wisest of preachers having said, "There is no new thing under the sun," it occurred to me that I might have read it somewhere, and if so, better told than I could tell it, and so I was bulldosed out of writing it at all.

But having found it a very nice thing to do, and seeing no mention of it anywhere, I have held it close to my eye and looked at it, through a pinhole as it were, until it has so magnified itself to my view, that I propose to present it to you here, even at the risk of taxing your patience with a great bore, for if it is not new to you, as it probably is

not, seen at a long range, you will wonder how so insignificant a thing *can* be such a bore. But here it is :

Having to insert two gold fillings in adjacent approximal cavities in the right superior lateral and central incisors of a crowded arch, I obtained what separation I could in the short time allowed (twelve hours), applied the dam and prepared the cavities, which extended from the labial surface of each tooth, midway between the cutting edge and the gum, narrowly through to the cervico-palatine margin of the enamel. The teeth being very thick, and only slightly separated, I plainly saw that if I inserted and finished a filling in either tooth alone it would be impossible to fill the remaining cavity satisfactorily, as the aperture made by both was barely large enough to allow the necessary movements of a plugger, and the patient objected to much showing of the gold. Having been accustomed to fill and finish each cavity separately, I was puzzled as to just what to do ; but happily this idea struck me—why not fill both at once, or alternately, first a little in one and then a little in the other, thus having the external labial opening the full size of both cavities, and enabling me to see every step of my way to the completion of the work ? I did so, occasionally pushing a very thin bur-nisher between the fillings to prevent cohesion, and thus what at first appeared to be a very difficult operation, I found comparatively easy.

Again, we will take the young and inexperienced dentist, who has before him an enormous cavity in the distal surface of a superior second molar, involving two-thirds of the crown and extending beneath the gum. The tooth is a valuable one and the property of a man who appreciates it as such, and relies upon the judgment of the operator as to what is best to fill it with. Now the dentist has read in some leading dental journal that “a tooth worth saving at all, is worth filling with gold,” and this seemingly verified by the signature of some gentleman whom he recognizes as eminent in his profession. In the same journal, and perhaps on the very next page, he has also read what seems to be a direct contradiction of the above, viz : “That in proportion as teeth need saving, gold is the worst material to use.” and this, the statement of equally as eminent a gentleman as the first. Recognizing the ability of both writers, and the advantage they have had of deducing these theories during long years of extensive practice, he is at a loss to decide whose teachings he shall follow. Shall it be the former and perhaps his own inclinations ? Knowing that good gold work is beautiful and must be well done, he knows that he must inflict upon his pa-

tient a long, painful, expensive, very tiresome, and perhaps worthless operation, worthless indeed unless he is a fine operator, for no bungler can fill such a cavity safely with gold. Following in the footsteps of the former, if he be unequal to the task of filling such a cavity, he will consider the tooth worthless and extract it, thus perhaps opening the way to a train of evils that will eventuate in the loss of several teeth. Shall he not rather accept the doctrines of the latter and use some good amalgam which takes comparatively a very short time to insert, with no pain and inconvenience, and at so much less expense of time and money, that should the plastic filling repeatedly need repair, it could be done as many times, with less cost, and loss of tooth structure, than if the gold filling should fail once?

I think you will all concede that the New Departure is gaining ground, and I am pleased to see it. I am also inclined to think that our exclusively gold men are very much like a dentist I once met, who was telling me that he used nothing but gold—nothing else was fit to use as a filling material in his opinion. Yet, when in his office and he was showing me his books, to give me some idea of his business, I noticed here and there as I glanced down the pages, charges for amalgam fillings, and I think we should find that our gold men either extract many teeth that might be saved for years; send them to some plastic-filling man to be saved, or use plastic-filling themselves. And I ask you, who is fulfilling the mission of our profession and subserving best the public interests, he who saves such teeth as will bear filling with gold, or he who from mere shells, crownless roots, etc., by the use of plastic fillings, rears for masticating purposes, something far superior to any artificial denture ever made.



THE SHIPMAN ENGINE.



BY A. H. SHIPMAN, ROCHESTER, N. Y.



When we first introduced our cheap foot-power machinery to the machine-using classes, the need of a small and inexpensive engine was as apparent to us as it was and had been to others; and quite as apparent was the difficulty of producing one that would meet the demands of the masses. We had ideas of our own in regard to this matter



THE SHIPMAN ENGINE.

then, and have had since, and for the past ten years have been perfecting them, the tangible result being the "Shipman" engine,—a practical motor for everybody and every purpose; whose first cost is but little, and which costs but little to maintain; a motor so simple that it can be managed by any- and everybody; that can be used any- and everywhere, on land or sea, in city or country; in the shop, the office, or the parlor; one that is always ready for use; that is absolutely safe, and needs little or no attention.

These problems have puzzled inventors for years, and this engine is the first to practically solve them. The engraving represents the smallest size manufactured, and is especially intended to furnish power for all purposes where at present foot-power is used—such as lathes,

scroll-saws, sewing-machines, coffee-grinders, churns, apple-parers, fanning-mills, tricycles, row-boats, etc. For these, and all other purposes where foot power is used, the "Shipman" engine is far superior to others, requiring no attention further than the occasional supplying of water and oil, thus leaving the operator free to attend to other work. The engine is compact, strong, and practically complete in all its details, and consists of engine, boiler, water-tank, fuel-tank, steam-gauge, water-gauge, pressure-regulator, safety-valve, governor to regulate speed, and pump to supply water to the boiler. It is thus more complete than any large and high-priced engine, is absolutely non-explosive, and positively safe from fire. Kerosene in connection with steam is used as fuel, which forms an intense blast of fire. Three quarts of oil is the greatest quantity it will consume in ten hours. A match puts the fire in full blast, and steam is formed in from two to three minutes. Ordinary gas may be used if preferred.

As steam is part of the fire, whatever amount of pressure the regulator is set at will be maintained as long as water and fuel are kept in the tanks, which require filling the second or third time a day only. Steam being part of the fire, if the pressure goes beyond the amount the regulator is set at, the fire goes out. This occurs only when the engine has been stopped and no steam is being used, or when there is no water in the boiler to make steam. No accident, therefore, can possibly occur either from over-pressure or from want of water in the boiler (*as in all other boilers*). These features are new.

Many will ask the question, What power do you call it? We answer in this way: It is sufficient to run any machine that a man can run by foot-power. We do this for the reason that should the proper rate per horse-power be given few would know its capacity. To those capable of judging we give the size of the cylinder and other points necessary: Cylinder, $1\frac{1}{2}$ inch bore; stroke, $1\frac{1}{2}$ inch; under all ordinary circumstances, 40 pounds of steam pressure; revolutions per minute, 600. Those capable of understanding horse-power may figure it out to their own satisfaction. To those not familiar with horse-power, the first statement will be readily understood, and for such is by far the more practical.

DENTAL THEORIES AND HOBBIES.

BY CHAS. J. ELLIS, D. D. S., CATTARAUGUS, N. Y.

[Read before the VIIth and VIIIth District Dental Societies, Oct., '83.]

I do not stand before you to give the result of years of labor, or tabulated record in any particular department of dentistry, but rather under the very general head of dental theories and hobbies, to give expression to some of the thoughts that I think we have all held at times in regard to radicals in the profession. I will at the outset admit that the world at large is governed and controlled by men of one idea or theory, but it is only when the theory or hobby is founded upon right and common sense.

In all struggles of party or government the men of extreme views are held in check by the practical men, whose opinions are based upon observation and common sense. England had her Cromwell and his religious hobbies; France her Napoleon and his dreams of French supremacy; we had our Jeff Davis and the State Rights hobby. But the common sense of the world at large always judges of a man's work, and surely answers the all important question, Will it *endure*?

Now if common sense guides the world at large, it should and does control sects and professions. And yet we find this same old warring of theories and hobbies on the one hand, and the common sense of the masses on the other. Look at the medical profession—take but one instance—the action of the New York State Convention in deciding to allow a member to use his own judgment as to those with whom he would consult, and then look at said action when it came to be considered by the National Medical Congress. It is still an open question with the medical profession if the theories and hobbies of the past will not, for the time at least, defeat the common sense of the present. When we confine ourselves to the dental profession, we seem to find the air full of opposing theories. To watch the dental literature carefully is but to notice the contents of one periodical flatly contradicting that of another. In conventions and meetings, from one to a dozen members will have his particular hobby to advance. If an elderly member, he will want to explain it carefully for the benefit of the younger members. The general reason of all this is easy to be given: Dentistry is made up of a multiplicity of little things, attention to little

details, and just in proportion to the number of little points is there chance of numerous theories. To a great extent this is unavoidable, but under all dental theories there is, or should be, ground for mutual agreement. Let us look at the outcome of theories when carried to the extreme, and not leavened by the important factor common sense.

We will glance at the past record. Perhaps you will say this is an age of progress, and we continually leave the error behind us. But I will answer that no greater errors have been made in the past than are now prevalent. Until advocates of a theory look into the reasons underlying it, and investigate from a scientific standpoint, the theories of yesterday will continue to be given up for those of to-day. I would like to call attention to one prominent theory of the past which was perhaps more zealously advocated, and practised with as little show of reason as any one we may enumerate. I refer to the so-called Arthur separations. We see its effects only in the mouths of the older patients, and happily it has no defenders of to-day. It was a grand scheme to improve the works of Providence, and although this might be said of the advocates of the extraction of the sixth year molars, they do not leave physical pain and ruin behind to torture for years.

I would probably give the general reason for its adoption in quoting from a friend who, in relating his experience with the theory, said: "I was led astray; it looked so plausible; but I made an ass of myself in practising it." Is n't it a marked illustration of how easy the rank and file of the profession follow the leader without due regard to their own individual judgment. It will always remain a tribute of confidence in Dr. Arthur, as well as a commentary upon the profession which so blindly followed him in this egregious error.

As a further illustration, I find in an early edition of a very popular work, the editor arguing that the popular opinion that creosote promotes decay is an *error*. The editor was writing ten or twelve years ago to confute a popular opinion. Now why was it popular? Could the first scientific reason have been advanced that it did promote decay? Are n't we safe in supposing that one or two had advanced the theory that it promoted decay, and numerous followers kept up the cry without any investigation of the facts? A little over a year ago (April, 1882), one of the scientific leaders of dental thought used these words in an article read before a New York society: "Pure carbolic acid is an irritant, and as such, when applied to tissues, excites inflammation just beneath the layer it has destroyed, a process which, in the

conservative treatment of the pulp, should be prevented. In the capping of partially inflamed pulps no other action is needed than that of a disinfectant, for which a five per cent. solution is ample." He makes this assertion, and produces no evidence beyond the names of two or three fellow theorists. I will venture the assertion that the great majority of all pulp saved have been treated with pure carbolic acid. The therapeutic properties of creosote and carbolic acid are about equal. Creosote is a rare drug, while carbolic acid is easy to procure from the coal tar, and the creosote, so called in the drug stores, is a solution of carbolic acid. Now a dentist, without proof to the contrary, would be well up in *theory* to be using 5 to 10 per cent. solutions, and the great majority too indifferent to try it. In referring to Wood's Therapeutics and Toxicology, he gives almost a page of reference as to its use in inflammation, and refers to a German writer's experience in a thousand cases of deep-seated inflammation. Before a meeting of the Pennsylvania Association of Dental Surgeons last December, one of the members introduced his subject of success in treating exposed pulps with pure carbolic acid, by calling attention to the clinical lectures of Dr. R. J. Levis, of the Pennsylvania Hospital, whose method of treating serous cysts, for instance a hydrocele, was first to evacuate the contents of the sac and then inject two drachms of deliquesced crystals of carbolic acid, and close the mouth of the wound with adhesive plaster. A feeling of warmth follows, but no pain, and no subsequent inflammation and forming of pus, which must escape or be absorbed, thus differing from iodine, which would produce inflammation and pus.

Now if you notice the connection, gentlemen, the doctor, in giving prominence to his success with exposed pulps, calls attention to the above as strongly supporting the common theory of the use of strong carbolic acid by dentists, for if two drachms of deliquesced crystals can be injected into a closed sac, as above, and no inflammation follow, it is common sense to say that it does not produce inflammation.

He further gave some experiments with carbolic acid and fluid albumen from an egg poured into test tubes, carbolic acid pure in the first, and then in varying strength. The result in the first was a dense white coagula, which formed a thin layer between the two liquids. This coagula did not increase after standing several hours, showing that the action of the strong acid is self-limited. The coagula formed in the other tubes showed a regular gradation in density and volume

as it became more dilute. That formed by the weaker solution being soft and friable, and without power to retain its form.

The gentleman concludes his remarks in the following words, which I might offer in contradistinction to the theory of the New York member of the profession, as you know Dr. Flagg delights in comparing in parallel columns. If you noticed, the words I quoted of the scientific writer of New York were these: "Pure carbolic acid is an irritant, and as such, when applied to tissues, excites inflammation just beneath the layer destroyed, a process which, in the conservative treatment of the pulp, should be prevented." The member of the Pennsylvania Association says: "If we decide to make an effort to restore the pulp to a physiological condition by *reducing the inflammation* and capping, the use of carbolic acid is indicated. When strong carbolic acid is applied the pain is lessened, and a pellicle of coagulated tissue is formed, which acts as a protective coating to the pulp beneath, preventing any irritation from the capping material."

I offer these three theories on carbolic acid, one, as I mentioned, of some years ago, and two of to-day. You can draw your own inference as to which is practical. I have perhaps given undue length and prominence to this one illustration of the contradiction of dental theories, but in one sense carbolic acid is the sheet anchor of the dental pharmacopœia, and deserves precedence.

Perhaps the most prolific source of theories during the past three years has been that of pivoting. We now watch for the new style of pivoting as we do for Fall or Spring clothing. The Richmond crown sprang into popular favor, but was soon followed by the Bonwill, and that in turn by a number of rivals, each loudly heralding its peculiar claims to superiority over any and all of its predecessors. One modest writer enumerates the leading styles, and then tells why his method is superior over all.

The writer was associated for a short time with a very ingenious member of the profession, who had his hobby, which turned upon a pivot also. He had them in stock at the dental depot, and printed slips of directions as long as the thirty-nine articles of faith—and just as useful. But he fell from grace, and deserted his elaborate hobby. One day I found him looking for an old fashioned three cent silver piece, with which and a plain plate tooth and a platinum wire, I saw him make and insert a very serviceable tooth in an amalgam setting.

I think we are all glad at times to resort to the old orthodox fashion of plain plate teeth with metal backings and platinum pivots. The question of pivoting is an interesting one, and one requiring good judgment to treat impartially, but as long as one combines strength with simplicity he will not be led astray. Reference has been made earlier in the article to dental literature and its contradictions. We could call your attention to a score or more of theories, each defended by its leaders, and every point denied by its opponents.

In truth it is an interesting study, and particularly to a young member who might be trying to seek an impartial view of certain theories. But I will only mention a few more, and not in detail: Arsenic, its application and its opponents: the filling of root canals; celluloid versus rubber: soft gold or cohesive, or none at all. And this brings us to the battleground of dentistry. This old fight over gold and amalgam has furnished hobbies to the thousand. One will tell you he uses such a grade of amalgam, and it is superior to any other; or only such a make of gold; or one will combine tin foil with gold, and make a compound hobby; but ask one such the all important *why?* and you can judge truly of that man's work. Beware of following any man's hobby unless he can give you a logical or scientific reason for its adoption.

Professor Flagg tells an amusing anecdote of a very prominent dentist preferring Arrington amalgam over Townsend's. He asked him *why?* and the reply was very exhaustive. Dr. Flagg says he could hardly credit his ears, for he knew from careful analysis that each amalgam contained the same metals, and in precisely the same proportion. But what shall we say of theorists who attempt to array the profession in separate factions? What should be the attitude of the profession in general towards the few who attempt to formulate a so-called creed as to whether *all* gold or *all* amalgam should be condemned? Should we as individuals surrender our judgment to champion a theory? I know of dentists who keep on file articles written by radicals with dishonest statements of a specious showing, and with these influence their patients. I would like to make the statement right here that a radical is never a safe man to follow. It has been said of poets that when one founds a peculiar school and achieves fame, his imitators only make wretched work.

Leaders are born and not made, and their theories are always safer in their own hands. I am one of those willing to believe that the de-

ceased Webb could do what few men in a generation could do, i. e., take his position as a radical and maintain his position against all odds. I am also willing to believe that Dr. Flagg can take his position at the other extreme, and maintain his position.

But how about you and me and the general results? Mention has just been made of following a radical's teachings. Some four years ago Dr. Webb told me in his office that he had no amalgam, and used none. I saw him insert a large gold filling in the distal surface of a lower twelfth year molar, or rather I saw part of the operation. I left some two hours after commencement—left the patient pumping the saliva with a throat dryer than that of a temperance orator, and went away filled with the glorious visions of the possibilities in store for me.

I had just matriculated in a dental school. How long do you suppose it was before I found out that the world was full of patients with cavities similar to the one specified, that couldn't or wouldn't pay to have gold inserted? Was it a possible thing for me to follow the all gold theory? On the other hand, knowing gold to be better in certain cases, could I follow the other extreme? But you will say we know all this, and have to practise eclecticism. Well, if we do, why waste time or argument over theories that are nothing but theories or hobbies. why should there be sufficient following to-day to warrant a formulating of creeds, and a deluge of articles in the periodicals that not one in a thousand really or honestly believes? Dentistry relies more upon common sense views and practice than any other profession. The physician never knows whether nature or his medicine has done the work. The lawyer says there isn't a law made but can be evaded. But the dentists' work is, like the poor, always present. We can see our work, done years ago, and always know the why, if we will.

I do not know whether I have made any one thought more prominent than another, but I have tried to call attention to some points that are worthy, in the proper hands, of receiving attention. I know there is a deal of hair-splitting and useless bolstering up of mere theories, of no practical use to any one. But I would not wish to stand in the light of a hypercritic, or take a pessimistic view of all dental theories, but rather to convey the honest impression of trying to find the best in all schools, and never be *tied* to theories and hobbies.

WHY DO THEY DO IT?

There are men of the highest eminence in this city who are in the habit of charging the nominal fee of a dollar for office consultations of all descriptions. Prescriptions for gonorrhœa, syphilis, and everything else, are scratched off indiscriminately by these mentors (?) for a dollar apiece, and set afloat to bob up occasionally as a grim accusation against us poor devils whose consciences are sufficiently callous (or better, who have sufficient self-respect) to enable us to charge ten dollars for a prescription for gonorrhœa. There are men in this city who will give ether or chloroform for a fee of two dollars; men too who occupy good positions. It is not pleasant to be informed that "Prof. So and So only charged me such a fee," etc. Many physicians make night calls for a couple of dollars. Now, under such circumstances, what is to be done by those who must practice for bread and butter? They must either work for nominal fees, or go to the wall. Not very pleasant, is it? But it is true. Probably the worst element of all is the average German physician, who works for the most trivial fees as a rule. Not that I would slur our German *confrères*, but I would most emphatically remind them that their profession has more claims upon them than their nationality. They should not do American practice for German fees. Why they have imported the German fee-bill it would be difficult to say, but practically, that is what they have done in this city, at least. Dr. Wendt's suggestion, that the "doctors charge more," is a good one, but I fear he can never make the "pigs in the clover-patch" see it. Verily, between high-toned (?) and low-priced "professors" (save the mark), and free clinics and dispensaries, the young man with a "small, but growing (?) practice" has a hard row to hoe, and must make gynecological examinations, and treat stricture of the urethra and piles at two dollars the sitting, or purchase Tanner's secret, and learn to live on air and professional "ethics."—*Medical Record*.

THE LAW OF HEREDITY.

Several years ago Professor E. S. Morse gave an address before the American Association for the Advancement of Science in which he detailed the contributions made by American naturalists to the theory of evolution. The present work is in our estimation more important than any mentioned in that address with the possible exception of the labors of Hyatt and Cope. Dr. Brooks' work is an attempt to explain the

cause of heredity and to that term our author gives the broadest meaning: "the production from a simple egg of a living animal, with the intricate structure and complex bodily and mental functions of its proper species." Besides this Dr. Brooks also essays an explanation of the cause of variation and as a corollary the origin of our present varied fauna and flora.

In his treatment Dr. Brooks first states the problem and then the different theories which have been advanced for its solution and the objections to each; next follows the proposed theory and, lastly, the facts and inferences bearing upon it. In his own words this new theory of heredity is:

"The union of two sexual elements gives variability. Conjugation is the primitive form of sexual reproduction. Here the functions of the two elements are alike and the union of parts derived from the bodies of the two parents simply insures variability in the offspring.

"In all multicellular organisms the ovum and the male cell have gradually become specialized in different directions.

"The ovum is a cell which has gradually acquired a complicated organization, and which contains material particles of some kind to correspond to each of the hereditary characteristics of the species.

"The ovum, like other cells, is able to reproduce its like, and it not only gives rise during the development to the divergent cells of the organism, but also to cells like itself. The ovarian ova of the offspring are these latter cells, or their direct unmodified descendants.

"Each cell of the body is, in a morphological sense, an independent individual. It has the power to grow, to give rise by division to similar cells, and to throw off minute germs. During the evolution of the species it has, by natural selection, acquired distinctive properties or functions, which are adapted to the conditions under which it is placed. So long as these conditions remain unchanged it performs its proper function as a part of the body; but when, through a change in its environment, its function is disturbed and its conditions of life become unfavorable, it throws off small particles which are the germs or 'gemmules' of this particular cell.

"These germs may be carried to all parts of the body. They may penetrate to an ovarian ovum or to a bud, but the male cell has gradually acquired as its especial and distinctive formation, a peculiar power to gather and store up germs.

"When the ovum is fertilized, each germ or 'gemmule' unites with, or

impregnates, that particle of the ovum which is destined to give rise in the offspring to the cell which corresponds to the one which produced the germ or gemmule ; or else it unites with a closely related particle, destined to give rise to a closely related cell.

"When this cell becomes developed in the body of the offspring it will be a hybrid, and will therefore tend to vary.

"As the ovarian ova of the offspring share by direct inheritance all the properties of the fertilized ovum, the organism to which they ultimately give rise will tend to vary in the same way. A cell which has thus varied will continue to throw off gemmules, and thus transmit variability to the corresponding part of the bodies of successive generations of descendants until a favorable variation is seized upon by natural selection.

"As the ovum which produced the organism thus selected will transmit the same variation to its ovarian ova by direct inheritance, the characteristic will be established as an hereditary race characteristic and will be perpetuated and transmitted, by selected individuals and their descendants, without gemmules.

"According to this view, the origin of a new variation is neither purely fortuitous nor due to the direct and definite modifying influence of changed conditions. A change in the environment of a cell causes it to throw off gemmules, and thus to transmit to descendants a tendency to vary in the part which is affected by the change."

This of course is pure theory, and, as will be readily seen, is a modification of the theory of pangenesis put forward by Darwin. Dr. Brooks has avoided some of the imperfections of that theory, and given us instead a train of logical sequences which would result in the formation of a new species, or carried farther a family or order. It does not fully explain the first cause of variation ; it only carries it one step farther back.

One very important law brought out in the present volume, and one which is fully illustrated by facts, is that the female element is the conservative one, while the male cell is, *par excellence*, the variable one.

Did space allow we would gladly pursue the analysis of this most interesting volume further, but in closing we would call attention to the fact that what Dr. Brooks considers as a theory of Mivart (p. 83, where it is called saltatory evolution) seems to us to be but a portion of the theory of acceleration and retardation formulated by Hyatt in 1866 and independently presented by Cope in 1868. Similarly Minot, before

Balfour, elaborated the hypothesis of the signification of the polar globules.

We would cordially commend this work to all who are interested in the philosophy of biology, whether as special students or in a more general manner, for it is one of the most suggestive works which have appeared since the first publication of Darwin's *Origin of Species*.—*Science Record*.

BEST METHOD OF PRODUCING ANÆSTHESIA.

First decide whether the person is in condition to take an anæsthetic. If there is neither heart trouble nor other obstacle in the way, let the patient fast about six hours previous to the administration. Have ready the following:

- 1st.—Alcohol 1 ounce.
Chloroform (Squibs) 2 ounces.
Ether (Squibs) 3 “

M

S. Anæsthetic.

2d.—A bag made by placing a newspaper on a towel or napkin, and folded in such a way as to cover the chin and nose. Let it be about five inches deep. Fasten a piece of wadding to the bottom of the bag to receive the anæsthetic.

3d.—A little cotton in a small vial with a few drops of nitrate of amyl on it.

4th.—An empty basin to hold a big sponge or towel, and near by some hot water.

5th.—The clothes of the patient perfectly loose, even to the garters, so that nothing may impede circulation; and see to it that the region of the heart may be easily reached.

Now why all these preparations? I can answer best by describing a case, the only one which might have resulted seriously.

I had to perform an operation. The assistant who administered the anæsthetic, forgot to “mind his own business”; he was anxious to see what I was doing. All at once he exclaimed: “Her eyes are wide open; she does n’t breathe!”

Now what? Be cool, for then you will do what is right, and do it quickly and well, which are all important, for life now hangs by seconds.

Quicker than I can tell it, I flung away the instrument I was holding.

put my left hand under the shoulder of the patient, pulled her out of bed in such a manner that her buttocks rested on the bed and her head touched the floor, and called out, "hot water!" I bared the breast and pressed the hot-water-soaked towel to her heart, and then—a gasp.

The lowering of the head alone might have answered; the hot water to the heart was certainly a great help, and had the breathing not been re-established immediately, I would have ordered the nitrate of amyle held to the nose.

How very important is it that even the minutest things be thought of and prepared before hand. Be prepared for emergencies always!—*Medical Truth* (abstract).



CULTIVATION OF BACTERIA—KOCH'S INGENUITY.

In studying the life-history of the Bacteria, by means of cultivation, it is sometimes found difficult to prevent various species growing together, so as to mask each other, and to render it impossible to determine what effects are due to each species. Lister, in order to overcome this difficulty, proposed to introduce a drop of an infusion, which might probably contain twenty species, into a large quantity of water, the dilution being calculated so that a *single* drop of the diluted bacterial mixture would probably contain a single Bacterium; which drop, when removed to a tube of sterilized fluid nutriment, would only produce a progeny of that particular Bacterium. But Koch has devised a still more ingenious plan. He spreads a layer of gelatine, so saturated with water as to become solid on cooling, on a glass slide. It is sterilized by boiling, and into it can be introduced some nutrient matter required by the Bacteria. In order to obtain pure cultivations a sterilized needle is dipped into a mixture containing various species, and with it a streak is made down the gelatine fluid. Bacteria are dropped at intervals, when, owing to the medium being solid, no mixture occurs; but each Bacteria produces round it a spherical nest of its own kind, from which individuals can be removed (with a sterilized needle) to start fresh, pure cultivations, by which means alone their specific characters and distinctive properties can be studied.—*Science Record*.

CRIES DENTIUM.

First. The contact of saliva with amylaceous or saccharine food, (not to speak of nitrogenous food,) or a solution of sugar or starch in saliva, kept at body temperature, invariably gives rise in four or five hours to a strong acid reaction, due to the generation of an organic acid.

Second. There must consequently be in the human mouth a constant though variable generation of acid, because of the impossibility of keeping the mouth perfectly free from food and from solutions of amyloids in saliva, which penetrate cracks, pits, and fissures, or are held by capillary attraction between the surfaces of teeth in contact, and there become acid by fermentation.

Third. The degree of acidity depends somewhat upon the length of time which has elapsed since partaking of food, and will be found greatest on rising in the morning.

Fourth. A cavity of decay in which saccharine or amylaceous food has remained for some hours, must and will be found, always and without exception, to have an acid reaction.

Fifth. The extent to which any tooth suffers from the action of the acid depends upon its density and structure, but more particularly upon the perfection of the enamel and the protection of the neck of the tooth by healthy gums. What we might call the perfect tooth would resist indefinitely the same acid to which a tooth of opposite character would succumb in a few weeks.

Sixth. An occasional possible absence of an acid reaction in a cavity of decay is no indication that acid has not participated in the production of the cavity. Little or no value can be attached to tests of the saliva alone.

Seventh. Any general or special disorder or condition of the system which results in the withdrawal of lime salts from a tooth, or in a lowering of its density, or in a weakening of the chemical union between the organic and inorganic matter of the tooth, renders it more liable to decay.

Eighth. Strong acid and corroding substances brought but momentarily into the human mouth, may give rise to lesions of the enamel at points where the ordinary agents alone could never have begun.

Ninth. All the *macroscopical* appearances and characteristics of caries may be produced with the greatest exactness *out* of the mouth,

simply by subjecting teeth to those acid mixtures which are constantly to be found *in* the mouth.

Tenth. The superficial layers of carious dentine undergo an almost, if not absolutely complete decalcification, which decreases as we approach the normal dentine. The same is true of dentine decalcified in saliva and bread.

Eleventh. The destruction of the organic constituents follows (not precedes) the decalcification, and is evidently for the most part to be ascribed to the action of fungi.

Twelfth. The fungi found in the human mouth do not participate *directly* in the process of decalcification. The exact part which they perform in the production of an acid reaction requires further investigation.

Thirteenth. The fungi produce the most manifold anatomical changes in the softened dentine, resulting in the complete obliteration of the structure and final disappearance of the tissue in a mass of debris and fungi.

Fourteenth. The invasion of the micro-organisms is always preceded by the extraction of the lime salts.

Fifteenth. The destruction of the tissue remaining after decalcification is effected almost wholly by fungi alone.

Sixteenth. Inflammation can hardly be looked upon as a very important factor in caries of the teeth.

Seventeenth. Caries of the enamel is purely chemical, the decalcification resulting at once in the complete dissolution of the tissue.

Eighteenth. Caries of cement runs a course analogous to caries of dentine, a softening of the tissue by acids, and following this its destruction by fungi; a slight inflammatory action on the part of the living matter in the corpuscles, is not to be excluded.—MILLER, *Independent Practitioner*.



WHY (?) AND HOW HE PASSED.



Some ten years ago, holding then substantially the same theories upon the subject that I have here voiced, I was ordered before the Board [for examination for promotion in the U.S. medical service.] I had been nine or ten years in the service, mostly spent, as usual, in the West and South. I had some reputation, such as it was, as a scientist; none at

all in the profession of medicine, for which I had never had any fancy or any ambition, and in which, consequently, I never displayed any special aptitude or excellence. I had doctored people to the best of my ability, cut off their legs and arms occasionally, taken care of government property, sent in regular reports, and obeyed orders—always in an automatic and perfunctory way, with my head full of other things in which I took a vivid, resistless, and irrepressible interest. I was at the time writing some books at the Smithsonian in Washington, and expected to continue to do so indefinitely—and, in fact, I have done so ever since. The order came without warning—though if I had been told to expect it every day for five years before, it would not have made any difference, I suppose. I voted the whole thing a bore; and being very busy indeed, wanted to get rid of it as soon as possible. I could not possibly have spared the time to do any cramming, had I been given opportunity to do so, and should never have been better prepared than I was at the moment. I did not expect to be thrown, I confess, but I knew perfectly well the Board could do so if they wished to; so I reasoned that I had better make it as pleasant as possible for the gentlemen I was to meet by not troubling them to put too many questions, the replies to which might not affect them agreeably. In fine, I was disposed to waive answers altogether, and so leave the Board quite free to act at its discretion.

I went to New York immediately, and had a good time for a few days with some officers who were there on the same errand, and then presented myself. After passing the compliments, and having some pleasant chat, "the trouble began." One of the gentlemen asked me about rheumatism and Bright's disease. I said that I did not know whether the blood was acid or alkaline in the former disease, nor how to cure it; and that I had never seen a case of Bright's disease. Another asked me what I thought of somebody's theory of phthisis. As I had never heard of the theory or its author, I said very truly that I did not think much of it, but presumed it had its merits. Another asked me about some delicate operation upon the eye, and I said I had never operated upon the eye, and never expected to. Things began to look queer, and it was odd-or-even whether I could make my theory of examinations work in that particular instance. But when it came the President's turn to interrogate me I felt easier; for I knew by common report that he was going to ask me what an aspirator was, and I had taken the trouble, that very morning, to hunt up one and master its mysteries. The contrast between my bold and cheery reply to this

momentous question, and my previous remarks on other topics, was too much for the gravity of my examiners, and there were five gentlemen grinning at one another like Cheshire cats in a moment. The aspirator finished the interview ; and taking a hint from the President, with alacrity I bowed and withdrew.

A few days afterward I received a letter from the Surgeon-General, informing me that the Board had found me qualified for promotion, but that I had apparently not kept up with the progress of medicine. Why, bless my soul, I could have told General Burns that, if he had asked me, instead of sending me to New York to prove it to four army surgeons by hunting up an aspirator ! What puzzled me was, how did they discover that I was qualified for promotion ? Excepting the aspirator, I had not given the slightest sign of knowing anything about my profession, to say nothing of keeping up with it. But I reflected that that was the Board's business to discover, and how they did it was a conundrum I was not obliged to answer. Remembering, also, that I could catch up with the procession at any time I wanted to, I lighted a cigarette with the Surgeon-General's communication, and thought no more about it.—COUES, *Medical Record*.



MORPHOLOGY OF THE BACTERIA.

They form the order SCHIZOMYCETES—or splitting fungi ; and although, in the present state of our knowledge, it is impossible to arrange an accurate classification on a scientific basis, there are five well-marked types into which they may be divided :—The *Micrococci*, the *Bacteria*, proper, the *Bacilli*, the *Vibriones* and the *Spirilla*.

I.—The *Micrococci* are minute oval or rounded granules, so small as to be immeasurable—but varying from 1-25,000th to 1-50,000th of an inch in diameter. They are motionless, and either solitary or forming small groups or beads ; and it is probable that some, if not all, the *Micrococci* are spores of other *Bacteria* ; but as some of them have not yet been known to develop under cultivation, they must for the present be classed as distinct.

II.—*Bacteria* are minute, oblong, cylindrical rods, having spontaneous movements : sometimes single, but usually attached in pairs, end to end, the pairs being produced by the self-division of solitary cells, they vary in length from 1-12,000th to 1-5,000th of an inch, and

are found to possess flagella ; of which, in the paired state, each has one at its free extremity, while the solitary ones have a flagellum at each end.

III.—*Bacilli* are slender filaments, straight, sometimes of considerable length, varying from 1-6,000th to 1-2,500th of an inch in length, endowed or not with motion ; and, under cultivation, forming spores, which lie in rows within the rods, and which at length fall to pieces, liberating the germs.

IV.—*Vibriones* are slender filaments, always undulating, distinguished from *Bacteria* by their wavy, serpentine movements.

V.—*Spirilla*. The largest of all the *Bacteria* (from 1-1,500th to 1-2,000th of an inch long) are characterized by the spiral coiling of the cell, and by their corkscrew-like movement.—*Science Record*.

HOSPITAL DUTIES.

“Parties having differences to settle,” remarked the Texas minister, just before the last hymn was sung, “will please do so out of church. The pulpit is already disgracefully peppered with buckshot, and half the Bible has been shot away through the careless aiming of firearms. Besides, the sexton complains that this washing up of blood and brains regularly every Sunday is not a part of his legitimate duty, and he wants extra pay for it. Sing, if you please, ‘A Charge to Keep I have.’”—*Graphic*.

REASONING IN A CIRCLE.

The annual address of the retiring President, Principal J. W. Dawson, of Montreal, dealt with some unsolved problems of geology. As reported, it reads like an essay of twenty years ago. It was to a very large extent an argument against evolution which, in 1863, would have been timely and valuable, but in 1883 it possessed neither of these features. By a fortunate coincidence, at the same meeting some of the “problems” were solved in a very able manner by Professor E. D. Cope in a lecture on “The Evidence for Evolution in the History of the Extinct Mammalia.” Dr. Dawson’s principal argument is that in the Palæozoic rocks forms of life appear suddenly and that transition does not occur, leaving it implied that we know all about the earliest fossiliferous rocks and that no new strata can be discovered or new types of

fossils found. This imperfection of the geological record is not a new argument. It was brought up a quarter of a century ago, some having the temerity to claim that of extinct mammals at least, no important forms were to be discovered. An extract from Professor Cope's lecture shows how completely this has been answered:—"When I first began the study of the fossil mammalia, about 1860, there were perhaps 250 species known. There are now something near 2000 and we are augmenting them all the time. I have found many myself; if they were distributed through the days of the year, I think that in some years I should have had several every day. But the accessions which are constantly being made make it unsafe to indulge in any prophecies, that, because such and such things have not been found, therefore such and such things cannot be; for we find such and such things really have been and really are discovered."

As a specimen of reasoning in a circle the presidential address is perfect. In substance it was said that we know that the same forms of life appeared simultaneously in all parts of the globe because they appear in rocks of the same age, and that we know the rocks to be of the same age because they contain the same fossils.—*Scientific and Literary Gossip.*

THE VALUE OF DIPLOMAS.

That important organ of public opinion, the *London Times*, intimates that bogus diplomas are nearly as good as any others; and that the title of M. D. might well be abolished, leaving to every one the right to call himself doctor who follows the indicated profession. Commenting upon the prosecution of Buchanan, for forging medical diplomas, it says the English universities have sinned quite as much as he, in making degrees a mere matter of money. Many thousands of men add M. A., D. D., or D. C. L. to their names without having answered a question, or shown any scholarship or knowledge over and above what was implied in a B. A. degree. The *Times* considers that Buchanan was only following out the general contempt for the value of learned titles which exists everywhere.

That this cynical view of the question is partially justified, is shown from an article in the *London Lancet*, which throws some light on the way degrees are given in England. It is there stated that there exists great inequality in the examinations. It is added that many cases of gross ignorance pass licensing boards. Even Sir James Paget had to

confess that the examination in his own college was most indefensibly defective. Thus, a person may practise medicine with authority anywhere in the British Empire without undergoing an examination either in chemistry, midwifery, materia medica, or the practice of medicine! Such persons are called surgeons, but are entitled to attend all cases.

We shall not make any remarks on the amount of knowledge required in most American colleges, nor estimate the exact value in erudition of the average graduate. That subject has been often enough discussed of late. Sufficient to say that no one will be bold enough to claim that most American diplomas guarantee even a moderate thoroughness in medical training.

Even in Germany, to which country we are accustomed to look for all that is solid in education, the complaint is frequent that medical botchwork prevails to an alarming extent. In fact, it was in that country that the enterprising Buchanan opened up one of his most active markets.—*Medical and Surgical Record*.

CONDUCTORIAL.

TOOTATORY.

This number of the ODONTOGRAPHIC JOURNAL brings Volume IV to a close. It's a very fair volume. The next volume will be as good, possibly better, if the "occasional evening" usually devoted to this business is not too frequently drawn upon for other and more important purposes.

VIITH AND VIIITH NOTES.

The union meeting of these societies at Buffalo in October last was a grand success.

The VIIth sent a full delegation; the VIIIth was "at home."

A "personage" of straw, better known as *Dental Education*, was set up against the wall, and from time to time, as opportunity offered, pelted with wads. At the close of the meeting he was still alive, and there is no question but that he will be on deck at the next meeting of no matter what society or where that meeting may be held.

That old veteran, Leach of the VIIIth, discussed "Principles," clinching his remarks with a story of an old doctor who had been asked by a fledgling for authority for his treatment of disease, and got for answer: "Authority! Why, you damn fool, I'm a doctor myself."

Drs. P. L. Stoddard and Chas. J. Ellis, whose papers may be found in another part of this number, prefaced the reading with something that sounded much like "first effort." All others present seconded the remark of a gentleman on the back seat, "Resolved that we have some more just like 'em."

Editor Barrett owns a type-writer. We know this because we saw it in his office. He uses it sometimes, whereat every man who has been favored with a letter by our neighbor should rejoice—not, however, because of the letter so much as the comforting assurance that in his attempt to decipher it he is not imperiling his immortal soul. The purchase of the t. w. is directly due to the appeal of one sorely tried. Like the good man that he is, he went right off and bought one.

NEW SOCIETY.

The "Maryland State Dental Association" was organized at the "University of Maryland," Oct. 18th, with the following named officers for the ensuing year:

President—E. J. Smithers.	Rec. Sec.—B. M. Hopkinson.
Vice Presidents—T. H. Davy and E. Genese.	Treasurer—O. C. McCurdy.
Cor. Sec.—Wm. A. Mills.	Ex-Com.—B. M. Wilkinson, J. C. Uhler and R. A. Hungerford.

MUST GO OVER.

Our hooks are filled with good original matter that we are obliged to put over until April, which prompts us to remark that the ODONTOGRAPHIC JOURNAL has got beyond begging for papers.

ANOTHER "FURRINER."

The *Independent Practitioner* has collared another continental contributor—a veritable Jenkins. His transcripts of letters from patients who "can't wait" would add greatly to the charm of "English as She is Spoke." Read him in the January number, proof of which has just come to hand.

NO MORE.

The last item for the third and last form of this issue had been with the printer but ten minutes when we heard with sincere regret of the suspension of the *Missouri Dental Journal*. When the present publisher and editors first took hold of it, every one felt assured that it would appear regularly and promptly, and contain the latest and best

that dentistry was capable of supplying. In this there has been no disappointment to its readers. We have drawn upon its pages from time to time, and have experienced some satisfaction in seeing it do the same by us. We hope to see it revived in the near future by some one able and willing to sink a little capital in placing a good thing on a solid footing. Drs. Pierson, Patterson and Hungerford must feel the effects of the *Journal's* demise more than others; for they started filled with enthusiasm, and are now compelled to throw to the winds a year's journalistic experience that on some other publication would have stood them well in the future. But such men are not easily discouraged or suppressed, and we expect to hear from them again in another quarter.

PELLETS.

The days of kidhood come to me
On memory's fleeting wings;
The days of measles, mumps, sore toes,
Stone-bruises, hives and things.—*Bismarck Tribune.*

Our Welch friend of Philadelphia fought long and well, but finally had to succumb. The "combination" was too much even for him.

Acids first, and then micro-organisms. Our Springfield friend has his Stockwell in hand, but practically and theoretically he's the under dog in the fight.

Some wise fellow says intemperance is due to frequent and extreme flexion of the arm, and suggests ankylosis of the elbow joint as a partial remedy.

Caulk, of cement fame, will soon issue "Caulk's Dental Annual for 1884." It will contain short papers on practical subjects, also general answers to the thousand and one questions asked by the inexperienced.

Vermont Sunday schools are beginning to hold chicken pie festivals. There is something delightfully refreshing about this. One can now reasonably expect to have his teeth cracked on something else besides an oyster shell.—*Burlington Free Press.*

A correspondent wants to know the difference between "Dentistry and Orthœpy" and "Dentistry and Otopathy," the titles of a pair of essays read not long ago. There are many, the former being very much more pronounced.

LIFE (AND OTHER) ISMS.

The involution of the editor.—From ears to shears.

A freak of Nature.—Mary had a little lamb.

Ad nauseum.—A patent medicine “ad.”

Odd Fellows’ motto.—Friendship, love and teeth.

Ars longa, vita brevis.—Cut it short, and write on but one side of the paper.

Does insurance insure?—The *Argonaut* says it does. It insures the company every time. “Heads I win, tails you lose.”

Stomach (slang for Hades).—A place of departed spirits.

Cassius was a Scotch fiddler—“Condemned to have an itching palm.”

Nice fresh butter.—A festive William goat in a crowd of boys.

 MICROSCOPICAL.

Tolles, up to the date of his death the foremost of objective makers, is dead.

The Microscope for December is a “buster.” Up De Graffe, of Elmira, is up as the target this time.” “It’s blood, but—dog or man?”

Mr. Ed. Bausch, of this city, has invented and patented a new mechanical stage that throws all others into the shade. The first one made was attached to a “Professional” stand, and expressed to Dr. J. C. Reeve, of Wheeling, Va., president of the Virginia State Medical Society. The whole outfit is worth going a long way to see.

Dr. W. T. Belfield has discovered that crystals characteristic of lard and tallow can be obtained by evaporating solutions of these fats in ether. The lard crystals yielded are rhomboidal plates with leveled ends, while those of tallow are plume-shaped and curved like an italic letter *f*. This difference of crystals gives a very simple means of testing lard, and has enabled the discoverer to testify in court that a given sample contained no tallow.—*Medical Bulletin*.

While glycerine is not a convenient medium for mounting still there are times when it becomes necessary to preserve specimens in this fluid. One great difficulty in its use is in fastening the cover glass firmly. Various modes of procedure have been described, possibly the best which the writer has seen in print being that which employs paraffin. A still better method is to use a very small amount of glycerine, so little in fact that when the cover is applied the margin of the glycerine does not reach the edge of the glass. Then with a fine brush, balsam or damar dissolved in benzole is allowed to run in under the edge of the cover glass and after becoming hard the superfluous balsam is cleaned off and the slide finished in any desired manner.—*Science Record*.

THE ODONTOGRAPHIC JOURNAL.

VOLUME V.—*April*, 1884.—I.

BONE-TISSUE.*

BY CARL HEITZMAN, M. D., NEW YORK.

DEVELOPMENT OF BONE FROM FIBROUS CONNECTIVE TISSUE.

A great part of the skeleton grows from fibrous connective tissue, independently of preformed cartilage. The strict distinction which in former times was made between "cartilaginous" and "covering" bones can be upheld only to a certain extent. It is true that in the production of covering bones no preformed cartilage participates, yet all the other bones of the skeleton, including the flat, the short, and the shaft-bones, obtain only a part—viz., their cancellous portion, from preformed cartilage. Their cortical or compact portion is formed entirely from periosteum. Many observers have noticed, in different places beneath the periosteum, cartilaginous layers; but no importance need be attached to the presence of such a layer, as the formation of bone-tissue is materially similar, whether it is developed from cartilage or from fibrous connective tissue.

In the shaft-bones of human embryos ten to twelve weeks old, when no trace of calcification is yet noticeable, the cartilage is found to be surrounded by a delicate fibrous investment,—the perichondrium,—

* Heitzman's MICROSCOPICAL MORPHOLOGY.

between which and the surface of the cartilage there is a broad layer of medullary tissue. From the latter tissue arises the future cortex, simultaneously with the calcification and ossification of the cartilage in the center. At the fourteenth week there is already a distinct cortex around the diaphysis, at the same time when the transformation of the cartilage into medulla and cancellous bone has also commenced in the central portion of the diaphysis. The cortex and the calcified cartilage occupy about the same height, the middle portion always being the starting-point for their formation. Both portions, however, at first exhibit the cancellous structure, while the formation of regular lamellæ begins to appear much later.

The first-formed cancellous bone of the cortex has a striated structure agreeing with the spindle-shaped territories of the mother-tissue—the periosteum. The first-formed cancellous bone of the center, on the contrary, is composed of globular territories corresponding to the globular territories of the mother tissue—the cartilage. It is only on this ground that we are able to understand the difference in the structure of the earliest-formed bones, the formation of “perforating fibers,” and the vascular system of the cortex. The law, however, according to which the peripheral lamellæ and the Haversian lamellæ are formed is not known. Probably there are three main layers in the original periosteum, the fibers and blood-vessels of which stand at right angles to each other.

The formation of bone from fibrous connective tissue is best studied in the skull of the human embryo, at about the fourth month of development.

We observe in the middle of a layer of fibrous connective tissue medullary corpuscles in longitudinal tracts (if cut transversely); we see that a number of such corpuscles coalesce in order to be transformed into basis-substance, which almost instantaneously becomes infiltrated with lime-salts. In this way trabeculæ of bone, with large and irregular bone-corpuscles, are formed between two layers of fibrous connective tissue, the outer of which is the future external, the inner the future internal, pericranium. Five or six years after birth, the latter separates from the skull-bone and furnishes the dense investment of the brain, the dura mater. The first trace of a bony formation is invariably found in the middle field between two blood-vessels, in those localities, therefore, where there is the least nutrition, in the same manner in which the bony formation arises from cartilage. The further growth of

the trabeculæ always proceeds from the medullary tissue, particularly from the medullary corpuscles, usually of only one side, lying close to the border of the trabecula. This process is identical with that of the growth of trabeculæ which have arisen from original cartilage.

For studying the details of the formation of bone from fibrous connective tissue, with high amplifications of the microscope, the best subject also is the skull of a human embryo.

We observe at first that, from single medullary corpuscles, often grouped together, basis-substance originates, which is at once infiltrated with lime-salts. The embryonal condition is next reëstablished in these corpuscles by liquefaction of the basis-substance, and they are again plastids, which may afterward coalesce to form a larger mass, the first indication of a territory, exhibiting a central boné-corpuscle. Still later, a number of such masses, always through the intervening condition of uncalcified medullary tissue, coalesce, and a trabecula arises, with a number of large and irregular bone-corpuscles, with their stellate offshoots. It makes no difference whether a blood-vessel is present from the beginning of the process, or whether it is formed afterward; it will always occupy the center of a medullary space. Upon close observation of the distances between the single bone-corpuscles, we are satisfied that at first from only a single corpuscle, and later from a limited number of medullary corpuscles, calcified basis-substance arises in the same manner, therefore, in which the myxomatous basis-substance is formed. At first, no distinct territories are present; these are only recognized later, when the lamellated structure begins to appear.

Obviously, the originally formed bone-tissue is not permanent. The bony trabeculæ in turn are repeatedly reduced by liquefaction of their basis-substance to the embryonal or medullary condition, and new bone-tissue continues to form up to the time of full development of the body. A continuous absorption and reformation of bone is probably going on throughout life. This, to some extent, is influenced by certain conditions—for example, on the skull-bones by the growth of the brain, both in a progressive and regressive way (Virchow). The regression is shown by the absorption in advancing age, producing the thinning of the bones so characteristic of the senile skeleton.

THE GROWTH AND RETROGRESSION OF BONE.

In the light of my researches, continued for ten years, the theory of an interstitial growth of the bone is no more tenable than is the inter-

stitial growth of any other tissue. Basis-substance, once formed, cannot increase in bulk by simple expansion. The observation that the bone-corpuscles in the old are farther separated than in the young is no proof of an interstitial growth, since Steudener has demonstrated that the peripheral portion of each bone-corpuscle in advancing age is transformed into basis-substance. *New tissue forms exclusively from embryonal or medullary tissue, and an already formed tissue must return to its embryonal condition, by liquefaction of the basis-substance, before a new tissue can arise. An augmentation of the bulk of a tissue can take place only by new formation of the living matter of the embryonal corpuscles, that is, an increase of the number of the embryonal corpuscles.*

This law was first, though incompletely, established by H. Müller, in 1858; it was asserted as to the growth of bone-tissue by L. Ranvier in 1865, and announced to be a universal law for all tissues by myself in 1873. The process of inflammation, first accurately studied by S. Stricker, also illustrates the law. Inflamed tissue, according to S. Stricker, returns first to its embryonal condition before new formation arises.

We are indebted to A. Kölliker's accurate researches* for the discovery that every growing bone on its surfaces exhibits regularly recurring "planes of resorption" (Resorptions-flächen). The bone to the naked eye looks rough, as if corroded; under the microscope the bone-tissue proves to be spongy, provided with bay-like erosions or excavations, which, as a rule, contain multinuclear bioplasson masses. Kölliker maintains that these bodies are growing into the bone-tissue from without, and that they actually absorb and destroy the bone structure. For this reason he proposed for their designation the rather alarming name of bone-breakers—"osteoklasts."

The multinuclear bioplasson bodies were first described by Robin under the title of "myeloplaxes." Virchow termed the same formations "giant-cells"; English authors, "myeloid cells." They are, as I demonstrated in 1873, the bioplasson formations of the bone-tissue itself, the territories of the basis-substance of bone, either after decalcification and liquefaction of the basis-substance, or before the formation of a territory of bone.

* "Die Normale Resorption des Knochengewebes u. ihre Bedeutung für die Entstehung der typischen Knochenformen." Leipzig, 1873.

We see these bodies, not only in medullary spaces of all juvenile bones, but also in the planes of absorption at the surface of growing bones, beneath the periosteum, and in inflamed bone. They certainly are not extraneous, but the medullary corpuscles themselves, coalesced into larger layers for the production of territories in forming bone. An already formed bone, being deprived of its basis-substance either by advancing growth or by the inflammatory process, at once falls back into the bioplasson stage, and exhibits first bioplasson territories, which later again divide into medullary corpuscles. All territories and all medullary plastids remain interconnected by means of delicate filaments, which traverse the surrounding light rims, and such a connection is also established with the adjacent reticulum of bioplasson of unchanged bony basis substance. In these masses we usually observe all stages of development of bioplasson, from the solid homogeneous lump into a nucleated plastid, and from this into plastids with nucleoli only, and finally into granular plastids, destitute of nuclei and nucleoli.

The interpretation here given does not, however, explain the appearance of such bioplasson bodies in dead bone. Ivory sticks, driven into living bone for surgical or experimental purposes (Billroth), and necrotic bone likewise, exhibit bay-like excavations at their surfaces, filled with multinuclear bioplasson masses. Obviously, these masses could not have originated from the dead ivory and the necrotic bone. Their bay-like excavations are explicable, as Virchow has already shown at length, by assuming in them a decalcification and liquefaction of the basis-substance, corresponding with the territories; and, since Ziegler has demonstrated that even between two thin glass plates, placed into the subcutaneous tissue of animals, migrating plastids accumulate and coalesce into multinuclear masses, a similar process may be admitted for the filling of these bay-like excavations.

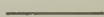
That the multinuclear bodies really arise from the liquefied living bone-tissue itself I have ascertained in provisional teeth, the erosions of which were studied, in the last few years, in my laboratory, by Dr. Frank Abbott; and there can be no doubt that they are a growth of medullary corpuscles from without, whenever the bone is deprived of its life.

Cartilage with advancing age gradually decreases in amount; in the aged we find only a thin layer of articular cartilage. In old dogs, the thin layer of the articular cartilage, toward the marrow spaces, is bordered by a well-marked lamellated zone of bone.

That the bone-tissue itself does decrease in bulk with advancing age is best illustrated by the toothless jaws of the aged. The cause of this absorption and atrophy of the bone-tissue, invading both the cancellous and compact structure, has not yet been elucidated.



OLEOMARGARINE AND GLUCOSE.



BY PRESIDENT H. F. ATWOOD, ROCHESTER, N. Y.



[Read before the Rochester Academy of Science.]

It has been customary for the retiring President to deliver an Address before the Academy at its annual meeting. It was with great pleasure that I learned some time since that such a duty is not prescribed by our by-laws, and hence not obligatory. Not being possessed of the faculty of making pleasant phrases, or of rounding off statements into symmetrical shapes, I am glad to find that I can escape that which I have never attempted, a something that would be an impossibility for me—an Address.

I can, however, substitute a paper on a subject that has interested me more or less for some time, and as it deals with a subject of popular as well as scientific interest, I trust that it will enable me to hold your attention for the few moments I shall speak. I shall present to you no results of original work, but trust that I may be able to present some facts in a new light; to submit for your consideration the claims of an under dog in a fight—I may say two under dogs in two fights. For the sake of argument, and also from what I believe to be a sense of justice, I will this evening appear in the role of champion or advocate of two young claimants for hospitality who, ever since their advent, have been bitterly maligned and abused, and mostly by people who hadn't the slightest idea of what they were talking about.

The foundlings that I bring up before you this evening, and for whom I ask you to judge calmly and dispassionately, before deciding upon their claims, are the much abused oleomargarine and glucose. The time such a subject as this demands, in order to do it justice, is not at my disposal, but we will try to consider some of what I believe to be the most salient points, and pass over them with sufficient rapidity, so that you may not be wearied.

In order to properly understand our subject, we must start at first principles and learn what oleomargarine is, and also what glucose is. After that is done, we will endeavor to establish their relationship to their predecessors, butter and sugar, their wholesomeness as articles of food, why they have been maligned, and last, but not least, the role they play in our national economy.

Let us consider, first, oleomargarine. The oil is a product of the fat of beef animals—the suet, as we are used to refer to it. This is cut up after being thoroughly washed, and the oil is extracted from the tissue at a comparatively low temperature, about 124 degrees. The oil is then kept at a temperature of from 80 to 90 degrees, long enough to give the stearine and palmitine opportunity to crystallize. They are then separated by hydraulic pressure, and the oil is now oleomargarine. In order to convert it into butter, this oil is mixed with pure sweet milk, say 500 parts of oleomargarine to 80 parts of milk, and churned. Directly after churning, it is run on ice, in order that it may congeal quickly, and thereby be kept from crystallization. It is then salted and worked the same as ordinary butter. This, in short, is the process.

Much has been said of the quality of the fat used, the lack of cleanliness in the factory, etc. In my capacity as an insurance “special” during several years past, it has been a part of my duty to inspect factories of almost every class in the United States, among others, oleomargarine factories and dairies; and I can say that of the three factories devoted to oleomargarine that I have visited, they were not only exceptionally clean, but were lacking in the disagreeable odor so common to dairies.

The manufacture of glucose, or grape sugar, is a little more complicated, but sufficiently simple for you to understand it from a verbal description.

The starch is extracted the same as in a starch factory. This is now acted upon by dilute sulphuric acid, and the starch converted into glucose syrup. The remaining acid is neutralized by the action of carbonate of lime, the syrup purified by passing through bone charcoal the same as in a cane sugar refinery, and the product sent out as glucose syrup, or reduced to grape sugar, a white, grainless product. The old process of disintegrating the corn by “putrefaction,” and which was a strong argument in the hands of the anti-glucose men, is now, I understand, done away with, and the starch is produced from the corn in less than twenty-four hours.

In considering the relationship that oleomargarine bears to butter, and glucose to sugar, we can at the same time consider their wholesomeness as articles of food. The best judges can hardly distinguish as between oleomargarine and butter—that is, by appearance and taste. Oleomargarine will remain sweet longer, is less liable to become rancid, and therefore is sought after particularly by seafaring men for long voyages. It is in cleanliness the equal, if not the superior of butter. I do not think any one looks with unkind feelings towards a nice suet pudding, and yet the suet used is the same material that is converted into oleomargarine.

Broad assertions have been made by parties who claim to have examined oleomargarine closely, that foreign bodies have been found in it. Such men as Professors Arnold and Mott refute this strongly. One observer in Chicago claims to have found in it forms frequently seen in foul water, and that he has seen eggs resembling those of the tape worm. As he claims to be a microscopist, it is unfair on his part not to give us the names of those forms that he saw in oleomargarine, and has frequently seen in foul water. If we knew what they were, we would be in position to decide as to their significance. However, his testimony is spoiled from a scientific standpoint by his finding of eggs like those of the tape worm. His zeal led him to overdo the thing. I have taken considerable interest in the study of parasites, have devoted considerable time to it, and have in my library considerable of the best literature bearing on the subject, and I know of no parasite found in that part of the animal that is used for oleomargarine.

The finding of tape worm eggs in it is simply absurd. They have no more business there than a gold dollar would have; as any one with the slightest knowledge of the natural history of this parasite can testify. If we want to find living organisms in plenty, we have only to put a drop of sour cream, from which butter is to be made, under a one-fifth objective. I think the exhibition would be a revelation to many of you, and would serve as a substitute for a visit to a first-class menagerie.

In the manufacture of glucose there is nothing objectionable; in fact, take it from the corn to the finished sugar, and it is a type of purity compared with cane sugar from the time it goes into the cane-mill until it gets to the refinery. Cane sugar is handled from the time it is cut until it goes on board ship, by semi-nude negroes, and reaches our ports as crude sugar in a condition that few of you imagine. It is

full of foreign substances. The sugar mite (*Acarus sacchari*), first detected in raw sugar by Hassall in 1851, is, says that author, almost constantly present, the statement being based upon the examination of not less than one hundred different samples of raw sugars.

He does not leave the *Acarus* here, but calling attention to the fact that it belongs to the same genus as the *scabei*, or itch insect, (the word "insect" is wrong as applied to an *Acarus*,) he endeavors to show that it is the cause of a skin disease common to those who handle raw sugars, commonly known as the "grocers' itch," and he makes a strong point on it too. Associated with this *Acarus* are generally found sporules of fungi in great abundance. Remember this is raw sugar. This is refined before reaching the consumers.

Now, on the other hand, let us look at a statement on page 506 of the Second Annual Report of the State Board of Health:

"Group VI., including sugars, syrups, molasses, glucose, confectionery, honey and soda-water syrups, was assigned to W. H. Pitt. The report is chiefly devoted to the discussion of the manufacture of glucose and its properties. It is shown that glucose is a pure and wholesome article of food, being carefully manufactured, and entirely free from objectionable impurities or admixtures."

This is copied from the report of the State Board of Health, and carries more weight than the statements of those who have been employed by interested parties to give scientific reasons why glucose is detrimental to health.

Now let us take into consideration what natural laws have to say in favor of grape sugar. I will quote quite freely from Julius Frenkel's treatise on the manufacture of starch, glucose, starch-sugar and dextrine.

Grape sugar is largely diffused throughout the vegetable as well as the animal kingdom, and is found in most of the sweet-tasting fruits, and in many parts of plants in larger or smaller quantities. In the sweet sap which accumulates in the honey-cups of plants, fruit sugar is found mostly along with cane-sugar, in great quantities. By the organism of the bee, however, the cane sugar is transformed into grape sugar. Thus the honey bee is a miniature glucose factory, and no one found fault with its product. It was not until the manufacture assumed larger proportions that opposition began to show itself. Glucose, or "grape sugar," is the form in which saccharine matter is normally

present in the blood and chyle. Cane sugar, when introduced into the system, passing into the circulation currents, is neither assimilated nor removed by combustion, but finds its way out of the system, essentially unchanged, by way of the kidneys; on the other hand, glucose, even when introduced into the system in much larger quantities, is entirely appropriated to useful purposes, not a trace of it being discoverable in the excrements. Indeed, when an insufficient quantity of the required sugar is received in food, the liver generates liberal supplies from starch and other sources. The starch taken into the system in a vegetable diet, is transformed into grape sugar by the action of saliva and other secretions. In a dicotyledonous plant, the germ is nourished by the pabulum in the cotyledons. That pabulum is glucose, made by the action of acids on the starch of which the cotyledons are largely composed.

These are facts that have been withheld from the public. Nevertheless they *are* facts, and deserve our thoughtful consideration. It is not claimed that grape sugar is as sweet as cane sugar; it is only two-fifths as sweet, and therefore a given quantity of it will not go as far as the same amount of cane sugar.

But as it is more thoroughly assimilated by the human system, and in fact the *only* form in which the system can accept it, should not we not only tolerate it, but give it the preference? I am not recommending that we should pay the price of granulated sugar, and receive grape sugar as a substitute, when it is worth far less per pound. I do not uphold for a moment the practices of a dealer who adulterates the higher with the lower priced article, and claims it is not adulterated, although to a certain extent the consumer is responsible for such frauds. The dealer will supply genuine articles when the buyer is willing to pay a price for it that allows a living profit; but when the customer insists on buying a manufactured stock at a price less than the crude material is worth, I claim the dealer is justified in adulterating.

The point I wish to make is this: when you recognize in oleomargarine and glucose their right to favor, they will come before you as articles on an equal footing with other merchandise, and not as adulterants, and you can buy them at their price, which, of course, should be less than that of butter and sugar. If your fathers and grandfathers before you had used oleomargarine and glucose, you would use them yourselves as a matter of custom; and were butter and cane sugar now pre-

sented to you as innovations, you would naturally look upon them with suspicion. And your suspicions would be verified when you saw under the microscope the myriads of *bacteria* in the cream, or the numbers of "*Acarus saccharina*" in the crude cane sugar. And you would reject both with greater vehemence than you have now oleomargarine and glucose.

The questions naturally arise, If oleomargarine and glucose are innocent, and are truly good, why have they been made the victims of so much persecution by the press—why has the public constantly maligned them, and why has adverse legislation been directed towards them? The answer to the second question appears in the first. The fact that the press has been against them is ample reason why the public should condemn them. The answer to the first and second may perhaps be synonymous. We will look at it from a business standpoint. Suppose a large number of dealers are handling butter; they form a butter and cheese exchange; in union there is strength; and they propose to repel the invasion of any enemy in the shape of a competitor. They are not going to stop at anything. If they can get the written opinion that is in their way of thinking, from some learned professor, who hangs out a sign, "Science for sale here at moderate prices," they are going to do it, and they will see to it that the aforesaid opinion gets a wide circulation through the press. They will also take charge of any necessary legislative work in Albany to carry out their plans of defence.

To illustrate this idea of combinations against competition let us assume that all the journeyman cigar-makers in New York State combine together in an alliance for protection. We will assume that they meet and fix upon a scale of prices that they will charge for their work. We will suppose some workers in their line do not join the organization are willing to work cheaper. This state of affairs militates against the success of the organization, and in order to remove this competition something must be done. We will assume that these lower priced cigar-makers work in the tenements where they and their families live, and thus, having no shop rent to pay, can afford to cut under the scale of prices adopted by the union. Now, let us suppose some shrewd man in the union sets his wits to work to find some way to annihilate this competition. Possibly he may argue to himself, if I could only get a State law passed, forbidding the manufacture of cigars in tenements, my point would be carried. But it would not do for me to let our real reasons be known; surely, we cannot get legislation directed against honest and legitimate industry.

Let us suppose a brilliant thought strikes him. All at once he discovers that it is very unhealthy to make cigars in a tenement house. He promulgates his views, the papers take it up, and everyone becomes at once solicitous about the health of those poor cigar makers in tenement houses.

Now, let us assume that blank petitions are presented all over the State, and largely signed, requesting our legislature to pass a law making it a criminal offense to manufacture cigars in tenement houses. We will assume that the legislature grants the prayer of the petitioners and does pass such a law. Now, what is the result? Mind you, we have only been assuming a case, and we can only assume the result; which I imagine would be, a grossly deceived public, and an obnoxious law, passed wholly in the interests of a particular branch of industry.

Thus you see it may not be very hard to influence public opinion when the subject is properly or improperly presented. And it is my private opinion, that if any, or all of you, will give the subject proper thought and consideration, you will frankly state, that personally you know nothing against oleomargarine or glucose, but you have heard and read so much in general against it that you, without giving the subject any particular attention, thought of course they were bad.

Now as regards national economy. When a building burns, it is a loss; no matter how much insurance thereon, no matter how wealthy the owner is, there is a loss, a loss to the country; so much of value has been wiped out. When a storm on the great lakes strikes a vessel and the vessel springs a leak and comes in to Buffalo with a cargo of corn soaked so it is virtually ruined, a loss and a serious one has occurred. But, suppose a plant exists that can take that ruined corn and by a simple process turn it into grape sugar or syrup, is not this a saving, not only to the immediate owner, but to the country? Put up a glucose factory at a new point in the West, every farmer for miles around is benefitted at once, by the increase in value of the corn he produces. The very farmer who reads in his country paper the slurs and tirades against oleomargarine and glucose, is reaping every day a benefit from their being produced. When the price of leather is high it immediately effects the price of raw hides; when they are high the farmer realizes an advance on the price of his cattle. When you can take a product of cattle that formerly sold as tallow for a few cents a pound and convert it into oleomargarine that is worth four times as much as the tallow, you have added to the value of the live cattle, and, therefore, enriched to that extent every farmer in the land.

These are simple well-known facts, and yet how few have taken them into consideration when discussing these subjects.

In the minority report to the New York Assembly Committee on Public Health, it is stated that "the total product of oleomargarine butter in New York State alone is 20,000,000 pounds per annum." If this product is sold as tallow, it brings, say 7 cents per pound. If sold as oleomargarine butter, it brings, say 20 cents per pound, or an increase of 13 cents per pound, in all an addition to our production of the State of \$2,600,000 per year, for this one industry. Surely a pretty important factor in our wealth to be carelessly brushed aside by adverse legislation, prompted by a few men who dislike a little wholesome competition.

As I stated at the beginning, this whole subject is one that requires more time than is at my disposal to do it justice. I have said enough however, to excite a discussion among you, and that is what we want more of in our meetings. We have here, this evening, a good representation of the most enlightened people in our city. We have chemists, physicists, and naturalists. I have taken a position before you that I wish you to attack. If you can bring sound and cogent reasons why we should discountenance the manufacture and use of oleomargarine and glucose, I wish to hear them, but I trust they may have more solid foundations than those we are accustomed to hear.

EYE-PIECES AND OBJECTIVES.

BY ED. BAUSCH, ROCHESTER, N. Y.

[Read before the Section of Microscopy, Rochester Academy of Science.]

The eye-piece and objective in the microscope are called the optical parts, but are essentially the only parts which make it up. The mechanical portions which are applied to the instrument are merely the conveniences for manipulating the object, and adjusting for focal distance.

The eye-piece is that portion of it which magnifies the image formed by the objective, and although its perfection depends upon its con-

struction and accuracy, the distinctness of the image depends upon the perfection of objective. All the various kinds of eye-pieces may be divided into two classes, the positive and the negative, in the former of which the focal point is outside of the lenses, and in front of the field lens, while in the latter it is internal, i. e., between the lenses.

In both the image is inverted, and its apparent size depends upon the combined foci of the eye-lens and field-lens. Among the positive are comprised the Ramsden, the Kellner Orthoscopic, the Periscopic, and others. The first is simply an ordinary magnifier, composed of two plano-convex lenses, and is used principally for micrometer work. The other two have correcting eye-lenses, and partially correct the errors in spherical aberration of the objective, thereby giving flatter and larger field.

In our correspondence we often find that there exists a misconception of the word positive, arising, I suppose, from the fact that the eye-piece which inverts the image is called the negative. Many suppose that it should show the image in a position corresponding to that of the object. Another eye-piece, however, is used for this purpose, which is composed of four lenses or systems, and is called the Erecting. It is seldom used with the microscope, but it is of great value in the telescope, when it is called a terrestrial eye-piece. It is also positive.

The most common form used with the microscope is the negative, or Huyghenian; another is called the Solid, from the fact that it is made of one piece of glass. It was invented by Mr. Tolles. In this, when the diaphragm is put in, which is not always the case, it is formed by cutting a circular groove into it, same as in the Coddington lens. These eye-pieces are made only in high powers, and although there is a greater loss of light by the passage of it through the entire length of the glass, than in the Huyghenian, there is less by refraction, as this occurs in only two surfaces, while in the other it is in four, and it consequently gives a better illuminated field with the same objective.

The method of denominating eye pieces of different powers has been by letters, A representing the lowest power. This method has always been open to criticism, as it insures no uniformity,—and none has been sought after, one eye-piece of one maker representing a totally different power from one of the same rating of another maker. A more rational system is coming into use, and was first introduced in this country. By it the eye-pieces are rated according to the equivalent focus of the eye-lens and field-lens. Thus an eye-piece in which

the equivalent focus is 1 inch, is called a 1 inch ; the $\frac{1}{2}$ inch in the same manner, and so on. This method gives approximately the magnifying power, as we know that a 1 inch lens magnifies ten times. It is supposed by many that the size of the tube influences the size of lenses and field, but beyond a certain limit this has no effect. The field is never enlarged beyond the requirements of the formula.

It is a pity that when the Royal Microscopical Society adopted the standard screw for objectives, it did not endeavor to arrive at more uniformity in the size of tubes. Our American Society of Microscopists is making a laudable effort in this direction, as also in the nomenclature of eye-pieces. Its committee has for the past two years been working up the subject, and it will probably be decided upon at the meeting to be held in this city. There are two difficulties which arise, one of which is the fact that one standard will not be sufficient, as it is manifest that a large tube which will be required in a large instrument will be out of place in a small one, and vice versa. Another drawback lies in the question whether manufacturers will universally adopt the standards, as it will entail a loss in proportion to the amount of business, which will in no case be small.

In passing to objectives I will state what is probably known to all, that their nomenclature or rating refers to their magnifying power, and has no reference to working distance. They are rated according to a lens, the magnifying power of which is equal to that formed by the lenses comprising the objectives.

Objectives are made up of systems—system meaning a single lens, or a set of lenses, which being cemented together, act like a single lens. Angular aperture is the angle formed by the extreme rays, which, coming from one point, are transmitted by the objective. Besides achromatism, it is the angular aperture of an objective which determines its quality. This it is which gives defining or resolving power to an objective,—which shows structure and detail. Angular aperture and working distance do not stand in a direct relation to each other, as is sometimes supposed. They vary according to the construction of the objective. In two objectives of the same angular aperture the working distance is not necessarily alike ; even with two objectives of the same power and different angle, the one with the larger angle may have the greater working distance.

This brings me to speak of a curious fact which, although I was aware of it, did not draw my particular notice until a recent occurrence. We had an objective, which, to all appearance, was in every respect perfect. It was made up of seven lenses, gave a clear cut, colorless image, and had good resolution. I was, however, not satisfied with it in this latter respect, and decided to make a new one. The formula involved only five lenses. After the objective had been completed, comparisons were made, and with the following result: The angular aperture was to a degree the same in both. Working distance did not vary 1-100th of an inch. Both were equally well corrected, and had the same magnifying power; and still the new one, with only five lenses, resolved 60,000 lines to the inch, where the old one with seven lenses showed only 40,000.

The quality of an objective depends upon its chromatic and spherical corrections, flatness of field, and angular aperture; and assuming objectives perfect in the first three qualities, we will only consider the latter. We say that objective is optically most perfect which has the greatest angular aperture. Why? Because it will show the greatest number of lines to the inch, by which I do not mean only ruled lines, or the much abused lines on diatoms, but structure and detail in the ordinary objects. It is absolutely necessary to use an objective of a given angular aperture in order to see a given number of lines, whether it be of one power or another. For instance, if you wish to see a line of 1-50,000th inch in width, it is necessary to use an objective with an angle of 65° , whether it be a $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{6}$, or $\frac{1}{8}$. An objective of smaller angle will not show them, no matter how perfect it may be. If the eye-piece be of too low a power, the lines may not be distinguishable with the $\frac{1}{2}$ or $\frac{1}{4}$, but by using the proper eye piece they will become so. This is not due to any particular quality of the eye piece, except in so far that it gives sufficient amplification to separate the lines that the eye may perceive them. It may be the $\frac{1}{8}$ objective with a 2-inch eye-piece, or the $\frac{1}{4}$ objective with a 1-inch eye-piece. This choice depends entirely upon the will of the worker, but has its limits. It is restricted on one side by angular aperture, on the other by the power of the objective which is used. There is a limit to the increase of amplification by eye-pieces, and when we cease to get a distinct image by adding higher power eye-pieces, we say it breaks down, i. e., there are not sufficient rays from the objective to bear the loss which each higher power of eye-pieces inflicts. By taking the same power objectives, but larger angle, we find that this can be done, which

is due to the fact that a much greater quantity of rays are transmitted, and those which come to the eye are in excess of those which were lost by passing through the eye-piece. The other difficulty is that as the objectives increase in power, the difficulty of making the lenses and mounting them increases in the same proportion, and faults occur, which, at the present day, it is impossible to avoid, and which detract considerably from the useful qualities.

Another factor enters here, which is, that the present ordinary methods of illumination under extremely high powers are insufficient to bring out details. I am happy to say that the demand for these high powers is gradually decreasing. By high powers I mean all those over a 1-16. Although there is perhaps much to be desired in the improvement of objectives, we may still consider our present state quite an advanced one. Although the present theoretical limit of visibility is fixed at 146,528 lines to the inch, we need not be deterred from *attempting* to pass this point. The limit which was accepted some years ago as the true one, although considerably lower, was quietly ignored as the angular aperture in objectives increased. It is only a few years ago that the majority of microscopists refused to believe that *A. Pellucida*, which has about 100,000 lines to the inch, could not be resolved, and now it is the work of beginners to do so.

But supposing 146,528 lines to be the limit, it is evident that a $\frac{1}{8}$ or 1-10 objective with a $\frac{1}{2}$ -inch eye-piece, is of amply sufficient magnifying power to make the lines visible to the eye, and there is therefore no need of using more. It is a good rule to follow, under all circumstances, not to use a greater power than is necessary to comfortably do the required work. Many people are unmindful of the fact that the amount of light which enters a room through a window is considerably more than that which comes through a key hole. The loss of light increases with each additional power, and it is perfectly natural when we consider that the openings in which the lenses are mounted decrease in the same ratio.

Magnifying power may be varied by means of the draw tube, but is seldom used, as it destroys the standard to which the objectives were adjusted. In speaking of a standard, I am forced to ask, Have we one? It is safe to say that none exists; and it is strange that after these many years which have been devoted to the improvement of the microscope, and where such marked improvements have been made, so little attention should have been paid to this important matter, and such a limited knowledge of the subject should exist.

It is said that 10 inches make the standard, but what constitutes the 10 inches? No book states whether it should be the length of the tube, or whether the distance is from the front of the objective to the eye-piece, or from the back of it to the eye-piece. The matter is receiving the attention of mathematicians, and it is now agreed upon that the 10 inches should be from the focal plane of the objective to the focal plane of the eye-piece. While the focal plane in the eye-piece is about at the diaphragm, that of the objective is back of the posterior system of the objective, and varies with every power. In the lower powers it may be as much as an inch, while in the higher ones it is reduced to almost nothing. This shows that every change of power, either in eye-piece or objective, deviates from the standard, and that it is next to impossible to fix one which, under all conditions, may be maintained.

Again, it has been assumed that, as the standard length was 10 inches, a 1-inch objective and 1-inch eye piece, each magnifying ten diameters, would give 100 diameters. But the actual measurements did not give this result, and from what I have stated it can be easily seen why.



DENTAL ENCYCLOPÆDIA.



Now and then, for a year or two past, we have met with items here and there that suggest the possession in the near future by the dental profession of a dental encyclopædia, that shall meet the wants of the worker who would easily and quickly ascertain the principles, methods and materials involved in the correct interpretation of present conditions, or the planning and execution of work at hand. As a contribution to the subject we present a report long buried in the transactions of the Dental Society of the State of New York. It was presented at the annual meeting held at Albany. — 1877, by Dr. W. A. Bronson, of the Special Committee on Dental Encyclopædia:

MR. PRESIDENT,—The committee to whom was entrusted the consideration of the question of a dental cyclopædia, to be prepared and put forth under the auspices of this society, has given the subject much thought and investigation, and reports as follows:

The first question apparent to the committee was, the probable value of a work of cyclopædic character to the general profession. An even

cursory examination of the literature of dentistry will reveal the fact that much time and labor has been, and is being, rendered valueless every day through a want of any standard of thought, method, or ideas in our specialty. This misdirection of valueable material can be plainly traced to the scattered, incomplete and unauthorative character of general dental literature. Without entering into the merits of the question of publication of dental periodicals by manufacturers of dental materials, it appears to be certain that existing dental literary work has, at present, no really popular or efficient exponent; and this in face of the fact that there are nearly 8,000 working dentists in this country. The press, through dissemination of ideas and methods, is everywhere acknowledged to be by far the most capable, efficient and popular educator of the age; yet this powerful agent, through misdirection, may, and often does, work far more harm than good to humanity.

Hence, the necessity for some standard of thought, ideas and methods, to prevent such misdirection of energies. In general literature this want is met by many and various works of reference, relating to all departments of life; prominent among which are found to be the various cyclopædic works existent in all civilized countries, and in nearly all the paths of human progress, which have risen to the dignity of sciences. The committee has thence concluded that a cyclopædia of our specialty, comprehensive in character, reasonably minute in detail, originated by an association of standing and respectability in the profession, containing articles from the best pens in dentistry, of a correct scheme and arrangement, and properly edited, cannot fail to be of immense advantage to the general profession, and must inevitably reflect great honor upon its originators and contributors. The next question which presented itself for settlement was the scheme of preparation of such a work. The main points of this question appear to be as follows:

1st. Preparation of cyclopædic essays, on main subjects, by the principal men of the whole profession.

2d. Collation and presentation of minor topics by an editor or editors.

3d. Arrangement and compilation of the material thus prepared in form for the press. Various minor details would follow these, which should, however, require consideration only upon the event of the work finally being determined upon.

The committee has in its possession, however, some manuscript sheets which have been prepared for it, as an index or indication of the possible form and scope of such a work, which are here presented.

ARS.

Arsenicum: (*αρριρ*, vigorous!) White Arsenic, Oxide of Arsenic, Ratsbane, Arsenious Acid, Arseniosum (Ph. U. S.), Arsenic Blanc (F) (As. O₃). An Acid, compact, white, heavy, fragile, vitreous aspect, opaque, covered with white dust; acrid and nauseous taste; without smell when cold; volatilized by heat, when it exhales the odor of garlic; soluble in water, alcohol and oil; crystalizable in regular octahedrons.

Sublimed Oxide of Arsenic, the kind used in medicine.—*Properties*: Tonic, escharotic, the most virulent of mineral poisons.—*Uses*: In intermittents, periodical headaches, neuroses, etc.—*Dose*: gr. $\frac{1}{10}$ to $\frac{1}{2}$, in pill.

HISTORY:

MONOGRAPH:

NIT:

Nitrous Oxide: *Gaseous Oxide of Nitrogen, Protoxide of Nitrogen, or of Azote, Laughing Gas, Gas Azoticum Oxygenatum* (NO).

PROPERTIES: A gas, colorless, nearly or quite inodorous, slightly sweetish taste, specific gravity 1.527. Cold water will absorb about three-fourths its bulk of the gas, and, under pressure, much more. Under cold and pressure it may be condensed into a liquid, which is colorless, very mobile, and remains liquid in air at 9° F.

EFFECTS: General stimulant, with special direction to the brain and nervous system. When inhaled, excitement of cerebral functions, exhilaration of spirits, laughter, delusions, a strong tendency to muscular action, loss of consciousness, insensibility to pain. These effects quickly subside, leaving no such depression, nausea, or uneasiness as follows the use of other stimulant narcotics. No case of death from this agent has been recorded; though it might be pushed far enough to produce death.

HISTORY: Discovered by Priestly, in 1776. Its anæsthetic effects suggested by Sir Humphrey Davy, in 1800; and their first application made by Horace Wells, a dentist, in the extraction of a tooth, at Hartford, Conn., December 11th, 1844. After an interval of comparative disuse, its employment revived in 1863, in dentistry, by G. Q. Colton,

and in surgery, by Dr. Carnochan, of New York. Now the most used and considered as the safest of all the anæsthetics.

MONOGRAPH :

A work of the character proposed in this report would necessarily be expensive, besides requiring some time and much care in its preparation. Inquiries made in this direction have resulted in two estimates of costs : one for publishing, and one for editing. The estimate for publication was made by Messrs. D. Appleton & Co., of New York city, and is based upon a work, without illustrations, of two volumes, of 750 pages each (1,500 in all), of the same size, paper, and general character as Appleton's New American Encyclopædia. According to the estimate, the composition, press-work, etc., of such a work, printed from type, will be about \$4,275. If stereotyped, the cost would be \$6,375. This is irrespective of the size of the edition, since, composition being once finished, any size of edition may be struck off at merely the cost of press-work. The paper, binding, etc., would cost \$1.12 per copy, or, for an edition of 500 copies, \$560. Thus an edition of 500 copies of a work in two volumes of 1,500 total pages, without illustrations, would cost for *publication* from plates about \$6,935, or from type, \$4,835. This is estimated upon the supposition that the society prints and publishes the work itself, owning the whole edition, carrying on its own sales and receiving all returns, which is a somewhat unusual method of procedure. A more ordinary manner of publication is as follows : The society to pay the *manufacturer's* cost of printing and binding, and edition to be agreed upon. The manufacturer to carry on all sales and receive all returns, out of which the manufacturer will return to the society a certain percentage upon the retail price of all books sold. The amount of this percentage is usually ten per cent. The last-named method is the one by which the great majority of all classes of books is published and sold. It requires a special agreement between publisher and originator, by which much lower terms are usually obtained to the originator than by the method first given. Hence, it would probably be the proper way to pursue should this society determine to have the work in question prepared. The cost of publication to the society would certainly be considerably less than is indicated by the figures presented above. The estimate for editorship, the matter being so far as yet in embryo, is necessarily somewhat vague and informal ; hence, the name of the estimator has been desired to be withheld from public notice at present. Still the amount named (\$5,000) will serve as an indication sufficient to allow the society to

form a reasonably exact idea of the total cost of the work. To sum up: The extent of cost of publication under the most unfavorable terms to the society, would be in round numbers, \$7,000 if stereotype plates were used, or \$5,000 if types alone. Taking the editorship at the only estimate offered (\$5,000), the total cost might thus range from \$12,000 or \$10,000 to some considerably lower sum, consequent upon a special agreement with the publishers in consonance with the terms of the second and more general method of publication. In conclusion, the committee believes there is sufficient intrinsic value in a work of the character indicated to ensure a sufficiently wide and remunerative sale, particularly if the method of subscription be taken and pursued with proper energy. As to the influence and power of such a work as a standard of reference and general educator, there can, it is conceived, be hardly any question.

(Signed)

B. R. MCGREGOR,
S. B. PALMER,
W. A. BRONSON,
E. A. BOGUE,
W. C. BARRETT,
G. C. DABOLL,

Committee.

The report was, on motion, ordered to be placed on file.

Dt. Wm. Jarvie, Jr., of Brooklyn, then offered the following resolutions, which were adopted:

Resolved. That the thanks of this society are hereby tendered to the committee on encyclopædia for the full and explicit statement of facts connected with the execution of the project, which was submitted to them for consideration, which they have presented.

Resolved. That in view of the large expense involved in the publication of an encyclopædia, it is deemed inexpedient at this time to take further action in the matter.

The following is one of several schemes in existence at or about the time of the presentation of the report, and undoubtedly the one according to which the major part of the work would have been done, had not the whole affair collapsed. This is its first appearance in print:

SCHEME OF A DENTAL ENCYCLOPEDIA.

GENERAL PROPOSITION.—To get up a work which shall contain the whole of the Principles and Science of Dentistry, so far as known and in force up to date, together with all the details (of any value) at present to be discovered.

DETAILED PLAN.—*Introduction*.—The work to contain five introductory chapters (*Historical*, *Operative* (including Surgery), *Mechanical*, *Scientific* (including Physiology, &c.), and *Statistical*), *general* in character, intended to afford a bird's-eye view of the rise and progress of the dentistry of the world, together with its status at present.

Main Work.—These to be followed by the body of the work, containing fully detailed information, *certain* in character, on all dental subjects, with full and complete references to the various sources of information on each subject treated of. The subjects (denominated, technically, “words.”) to be arranged alphabetically.

Indices.—Three indices to follow the body of the work.—one an index of the *words*, paged; one an index of *subjects*, paged; one an index of *references* (This will form a complete dental literary catalogue and index, both of standard and periodical literature).

METHOD OF CONSTRUCTION.—*Editor-in-Chief*.—The work to be in charge of an Editor-in-Chief, upon whom will devolve the whole conduct of the enterprise—the literary work, proof-reading, correspondence, collection and arrangement of material, &c., &c.

Associate Editors.—He to be assisted by a corps of Associate Editors, whose province it will be to read and revise all the manuscript, before printing, in order to ensure absence of error and fulness of detail. These to be selected because of their fitness and high professional standing.

Monographists.—Certain main words, of more than ordinary importance, and requiring for their proper treatment special knowledge and experience, will demand extended handling. These will be delegated to individuals widely known as authorities on these subjects, who will treat them exhaustively: after which, each such monograph, like the rest of the work, will undergo the scrutiny and revision of the editor and associate editors, in order to eliminate all traces of personal bias, and make it impartial and thorough. The names of the monographists to be inserted in a list, with references to their productions.

Illustrations.—To work to be as fully illustrated as possible, both by original and borrowed material. In this it is believed the various publishers of dental and scientific works, and the dental manufacturers, will afford material aid, upon due credit being given.

The following (in type for the first time) was looked upon by those who had given the matter abundant thought, as a satisfactory outline of a

PLAN OF PROCEDURE.

1. To show scheme to leading dentists, and get their opinion and approbation (if possible, *in writing* (signature)).
2. To write to (say 300) dentists, briefly detailing scheme, and asking their opinion.
3. To select a corps of associate editors and obtain their assent to such action.
4. To select monographists by name, but not to inform them of such choice until certain the work will proceed.
5. To then go to publisher with matter obtained as above, and see what he will do. In this we must obtain the aid of those very influential with him, and also take letters of introduction from prominent men.

We do not know what the future has in store for the dental profession, but certainly nothing has come of the work already done. We hope for something, but for the present—Exit encyclopædia.

“LET CHAOS COME AGAIN.”

DR. WATT.—Who lectures in the Hall of Arts to-day?

DR. ATKINSON.—I, sir, on Abstract Philosophy.

There I propose considering, at length,
 Three points—The Is, the Might Be, and the Must.
 Whether the Is, from being actual fact,
 Is more important than the vague Might Be,
 Or the Might Be, from taking wider scope,
 Is for that reason greater than the Is;
 And lastly, how the Is and Might Be stand
 Compared with the inevitable Must!—*Princess Ida* (?)

A PLENUM TO ITSELF, BUT NOT TO OTHER VAPORS.

Carefully conducted experiments have demonstrated the general law that atmospheric air is a vacuum to the vapor of water and other similar vapors, while each particular vapor is a plenum to itself, though not to other vapors; or, otherwise stated, if a given space, at a given temperature, be filled with air, the quantity of aqueous vapor that it is capable of holding is the same as though this space contained no air at all, nor anything else. But this same space may contain a much smaller quantity of aqueous vapor, and yet be absolutely impenetrable to aqueous vapor, provided its temperature is unaltered. Thus, if a bell-glass filled with air under ordinary pressure, at the temperature of 100° Fahr., be placed over a dish of water at same temperature, a quantity of vapor, equal to one-thirtieth (in round numbers) of the weight of the air, will rise into the bell-glass, and there remain diffused throughout. If there were less air, or no air at all (temperature remaining the same), the bell glass would obtain and hold the same quantity of vapor. If, instead of being filled with air, it contained at the outset only this one-thirtieth of aqueous vapor, it would now be an impenetrable plenum, behaving like a solid to aqueous vapor—no more can be forced into it without raising its temperature. But while thus charged with aqueous vapor, there would still be room for vapor of alcohol, turpentine, ether, or chloroform, etc. It would be a vacuum to these, though a plenum to itself. On the other hand, if the alcohol, turpentine, ether, or chloroform were allowed to evaporate into the bell-glass, a certain quantity of either of these vapors would presently enter it, and then this vapor would act like a solid mass in resisting the entry of any more of its own kind, while it would be freely pervious to the vapor of water or that of the other liquids.

A practical example will further illustrate this. Some years ago I was engaged in the distillation of paraffin-oil, and had a few thousand gallons of the crude liquid in a still with a tall head and a rising condenser. In spite of severe firing, the distillation proceeded very slowly. Then I threw into the still, just above the surface of the oil, a jet of steam. The rate of distillation immediately increased with the same firing, although the steam was of much lower temperature than the boiling oil, and therefore wasted much heat. The *rationale* of this was that at first an atmosphere of oil-vapor stood over the oil, and this was impervious to more oil-vapor, but, on sweeping this out and replacing

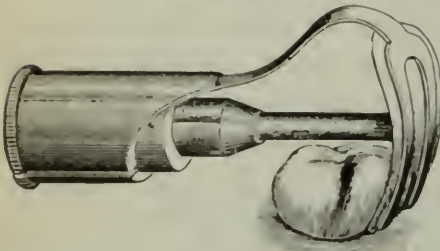
it by steam, the atmosphere above the liquid oil was permeable by oil-vapor. This principle is largely applied in similar distillations.—*WILLIAMS, Popular Science Monthly.*

ON THE USE OF FLEXIBLE DISKS.

When, several years ago, I devised flexible disks for use in the mouth, my object was to be able to employ the dental engine in polishing to a greater extent than was possible with the rigid disks then in use.

Although flexible disks in one form or another, as for example, soft rubber, emery paper, and celluloid, are now in general use, no one so far as I am aware has fully grasped my idea. The disks are used as if they were rigid,—I mean without any appliances to curve them to correspond to the curved surfaces of the teeth. A

FIG. 1.



moment's reflection ought to convince anyone that this is an essential part of the idea. My present object is therefore to describe several of the simple devices which I use for this purpose. This can best be done by referring to the figures which accompany this paper.

FIG. 2.

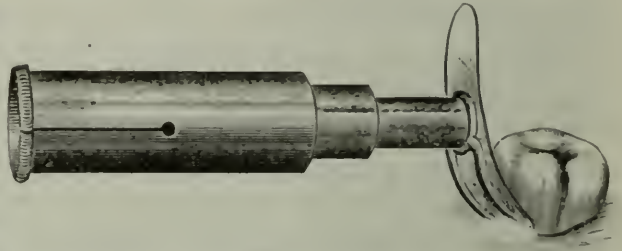
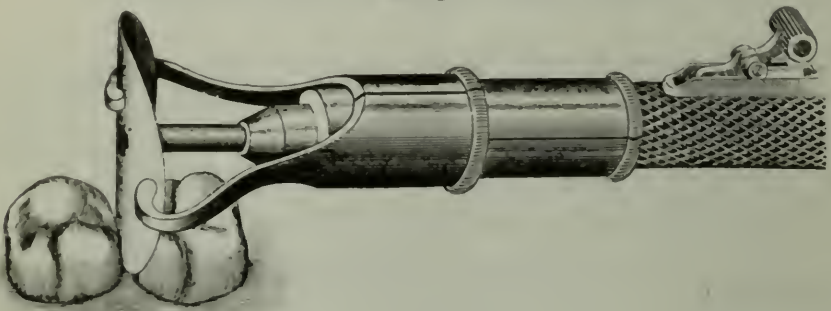


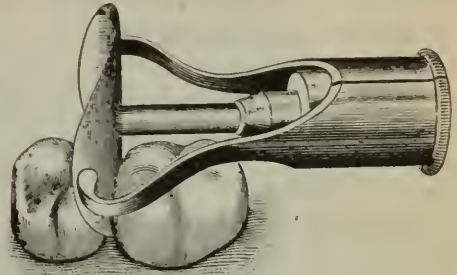
FIG. 3.



Let the instruments have tubular shanks to slip onto the hand-piece of the dental engine, their positions and consequently the curvatures of the disks being regulated by the milled collars in Figs. 1, 2, 3, 4.

Figs 1 and 2 show what may be called two-pronged fork-benders. They are intended to curve the disks, so that they can be brought against the cervical wall of a contour approximal filling, or against the necks of the teeth.

FIG. 4.



The instrument shown in Fig. 3 and 4 is intended to curve the disks from side to side; as shown in Fig. 3, to polish the distal surfaces, and as shown in Fig. 4, the mesial.

The instruments are of brass, except the arms, which should be of steel. They are simple and efficient.—ROLLINS, *Dental Cosmos*.



HALLUCINATIONS, ILLUSIONS, AND DELUSIONS.

The patient now before you may be disposed of in a few minutes. He was before the class a year ago. He is a painter by occupation, although for the past few years he has retired from business, so that he has not come in contact with lead. It is not a case of lead poisoning, although it is probable that lead has something to do with the state in which we find this patient. He is 62 years of age, and has more or less rigid vessels, more particularly affecting the vessels of the brain. He has persistent headache, attacks of vertigo, and is of a gloomy, despondent disposition. He also has a delusion of a peculiar kind, which he has not been able to describe. The delusion is that there is something within him which moves outward; some sort of a thing which he cannot define, and of which, although I have repeatedly questioned him, I have been unable to obtain any definite conception. A year ago, this something seemed to affect persons and things near him. He has, however, so much improved during the past twelve months that he recognizes that this outside body has no existence, but he still thinks that it is within him.

My object in bringing this patient before you is not to refer particularly to his condition, but to give you a few points in reference to the distinction between hallucination and illusion on the one hand, and between hallucination, illusion, and delusion on the other. After you have begun to practice you may some time find yourself before a court, and a sharp attorney will put questions something like these to you:

What is the distinction between a hallucination and an illusion? and what is the difference between a hallucination, an illusion, and a delusion? It is an unpleasant predicament to be in if you are not able to answer these questions.

A hallucination is a disordered mental conception. It is something in the mind. The mind conceives that exist which has no existence. If I, looking at the table on which there is nothing, fancy that a man is sitting on the table, that is a hallucination. If, however, there be a chair on the table, and I fancy that the chair is a man, that is an illusion; that is the perversion of an object which exists. A hallucination is the mental conception of that which has no existence, while an illusion is the perversion of an object which does exist.

What is the distinction between hallucination, illusion, and delusion? A hallucination, as in the case before us, may also be a delusion, provided the individual is unable to see that he is the subject of a hallucination. In other words, if the hallucination is real to him, and his reason cannot correct it, or your reasoning cannot convince him, then he is deluded, or that is a delusion. Again, if the perversion of an external object which we call an illusion, is real to the individual, and he cannot be convinced of the error of his perception, then he is the subject of a delusion.—BARTHOLOW, *Medical Bulletin*.



THE USE OF PEROXIDE OF HYDROGEN IN DENTAL SURGERY.



The letter of Dr. R. W. Steyer on page 81 of the *Medical Record*, concerning the uses of peroxide of hydrogen in the treatment of venereal diseases, also contains a brief reference to its use in dental surgery as a mouth wash. The attention of physicians and surgeons is hereby directed to it, and its efficiency as a thorough cleanser of the oral cavity when that cavity needs such cleansing; but it is not as a mouth wash alone that it is used in dental surgery. Practitioners of dentistry are using it daily for the bleaching of pulpless (discolored) teeth, in the treatment of alveolar abscess, and as an injection into the pockets of the so-called Rigg's disease, or pyorrhœa alveolaris. As a germicide for the destruction of the micrococci found in the pus of pyorrhœa it is unrivalled. Your correspondent has used it as an injection in abscess of the antrum, with most gratifying results. Its *modus operandi* seems

to be as follows : When H_2O_2 is brought in contact with pus, the extra O is liberated so rapidly that the H and S of the tissues immediately combine with it, resulting in H_2SO_4 in small quantity, sufficient to glaze the surface of the pus-producing area, thereby affording an opportunity for the exuding protoplasmic material to be organized into new tissue. The remaining unsatisfied atoms of O quickly distend the pus sac or pocket, such as is observed in alveolar abscess, and force the contents through the root canal of the tooth or the fistulous tract to the gum surface. The introduction of H_2O_2 in dental surgery is already revolutionizing the treatment of the above-named diseases, as it is likely to do in ophthalmic, aural, and genito-urinary surgery.—HARLAN, *Medical Record*.

RHEUMATISM.

Rheumatism is said to be somewhat chronic when a person has enjoyed it for forty-three years and dies before the last medicine taken could produce its legitimate effect. This argues in favor of rheumatism as a desirable disease.

It is a spicy disease; for, like *Life*, it has many varieties, which are too numerous to mention.

It is not found in sacred or profane history by a person who does not search the authorities.

Among the easiest ways to obtain rheumatism is to sit in a draft without a coat, to bet the limit on an ace flush and get into a perspiration. The other fellow then produces his royal straight flush. This produces comment upon Miss Blazes (given name Helen), which rheumatism does also.

Diatomes never have rheumatism; but as the general reader is not presumed to know what a diatome is, this is not a fact of popular moment.

A fairly good way to obtain rheumatism is to read a newspaper fresh from the press, while the morning dew still hangs around it.

Another means is to "take cold." The person from whom it is taken rarely objects and never prosecutes.

Rheumatism can also be secured by persons who have a talent for it, who get wet in a rain or otherwise, and allow the clothes to dry on the body.

It is good to have a stock of rheumatism in the house when a life insurance agent calls. If none is on hand it can be obtained by carrying said agent bodily to the fourth story, dropping him out of the window, and then drinking nine iced lemonades without sticks.

A daisy rheumatism, so to speak, is found in the green sward, if the applicant will turn out to lie—on the grass in December.

Short-breathed persons can get a good, snbstantial rheumatism by precessionizing on each centennial of Evacuation Day, which usually occurs on a rainy 24th of November.

As there is nothing particularly funny about rheumatism, it will be dropped here, with the reminder that it is "fun for the druggist, but hardly for the patient."—*Life*.



THE PREACHER AND THE QUACK.

He who sups with the devil generally finds it convenient to use a very long spoon, and keep at a safe distance. It is also quite necessary, in order to enjoy the meal, that he have the Satanic faculty of blowing hot and cold in the same breath. When these conditions are fulfilled, conscience can be reconciled to the emergencies of rapidly changing relations, and the evil and good be seemingly assimilated with each other in consisteut whole.

Our religious contemporaries somehow or other always make a bad showing in their attempts to trim to the temptations of the hour. They can apparently resist the devil in every other shape save when he appears in their advertising columns. The *Watchman* cries "What of the night?" in one column, and proclaims a cure for gonorrhœa in another. When "the morning cometh," the reading of "Paradise Lost" is next in order. The *Evangelist* descends to earth to cure cancer, and the *Christian Intelligencer*, the avowed advocate of the pure and the good, stands upon the ramparts of Christendom, holding the Bible in one hand, a kidney cure in the other, and warning all to flee from the wrath to come. In a recent issue of this model Christian intelligence disseminator, and spliced between columns advertising Paul's departure from Corinth, lessons for to day, and the influence of Christian wives, on the one hand; and pile cures, consumption arresters, and blood-purifiers on the other, is an account of a prophecy which, in substance, declares that when Mars, Neptune, Jupiter, and Saturn dance around

the sun, that the moon will eventually fulfil its ultimate destiny, and a terrible atmospheric upset will eventuate. As a consequence, much sickness will prevail, and death and desolation will culminate in a grand Black Friday for the unfittest. "But," soberly says the *Intelligencer*, "we are told for our comfort that the strong and pure-blooded need have little to fear in these calamities," and that it is only necessary to keep the liver and kidney in good condition by a sure-cure kidney-remedy. We do not mean to say that this is not paid for, so much per line; but the good editor has not spoon long enough to appear at his ease when at supper. Under the lessons of the day we learn that those who have heard the gospel have themselves to blame if they are not saved," and in the next column the devil mounts the pulpit and tells the congregation how it is done. Again, the lesson in the previous column significantly says: "Laborers for Christ need our hearty sympathy," and we presume, therefore, that they get it. And "the greatest of these is charity," in helping along the benefactor of his kind. It is sweet also to learn, in glancing from the perusal of the moon dance and the medicine bottle, that "friendships founded on common love for Christ are strong and tender." Therefore we do not think it likely that the man with the bottle and the man with the Bible are likely to fall out.—*Medical Record*.



THE APE AND THE LADY.



A lady fair, of lineage high,
Was loved by an ape, in the days gone by—
The maid was radiant as the sun,
The ape was a most unsightly one—
 So it would not do—
 His scheme fell through,
For the maid, when his love took formal shape,
 Expressed such terror
 At his monstrous error,
That he stammered an apology and made his 'scape,
The picture of a disconcerted ape.

With a view to rise in the social scale,
He shaved his bristles, and he docked his tail,
He grew moustachios, and he took his tub—
And he paid a guinea to a toilet club—
 But it would not do,
 The scheme fell through—

For the maid was Beauty's fairest Queen.
 With golden tresses,
 Like a real princess's
 While the ape, despite his razor keen,
 Was the apiest ape that ever was seen.

He bought white ties, and he bought dress suits.
 He crammed his feet into bright tight boots—
 And to start in life on a bran new plan,
 He christened himself Darwinian Man!

But it would not do,
 The scheme fell through —
 For the maiden fair, whom the monkey craved,
 Was a radiant Being,
 With a brain far-seeing,
 While a shaved monkey, though well-behaved,
 At best is only a monkey shaved!

—LADY PSYCHE, *Princess Ida*.

HOW TO MAKE AN EYE-PIECE MICROMETER.

The value of an eye-piece micrometer is comparatively slight, but still it has its use. Mr. W. M. Bale describes a simple method of making one in the *Southern Science Record*, an abstract of which may be interesting. He takes as his material fine silk raveled from a ribbon. Unscrewing the field lens from an objective he applies two small particles of stiff balsam to the lower surface of the diaphragm. Then taking a small portion of the silk fibre he fixes one end in the balsam and then stretching the fibre fastens the other end in the same manner. The field lens is now replaced, and the fibre examined, and if found straight the next step follows. If not, it is replaced by a better piece. The next step which is to attach a second fibre parallel to and at a given distance from the first, is a matter of more difficulty. The distance of course will depend on the space to be measured. Assuming that it is to be 1-1000 of an inch with a C eye-piece and a $\frac{1}{4}$ -inch objective, it will be about a thirtieth of an inch. The fibre is placed in such a position and then the eye-piece is placed in its proper position in the microscope and with a $\frac{1}{4}$ -inch objective a stage micrometer divided to 1-1000th in. is examined. This will of course reveal whether the fibres of silk are too near or too far apart. If all right a third fibre and so on is attached in the same manner, and examined each time. If one of the lines is improperly placed it must of course be corrected. After the lines are in position Mr. Bale fixes them with slips of gummed paper, exercising the greatest care to avoid moving the lines.—*Science Record*.

CONDUCTORIAL.

THE WORK-BY SECTIONS PLAN.

The leading editorial of the March *Dental Cosmos* elicited the following brief communication from a well-known member of the profession, who, some years ago, did what he could to induce the VIIth and VIIIth district dental societies to do something having at least the semblance of scientific work, but who, some time since, and for the sake of getting useless machinery out of the way, suggested (and the suggestion was adopted) that the plan of work by sections be abandoned, and that the societies return to the plan that was born of laziness and that will find its consummation in associated imbecility:

The editor of the *Dental Cosmos*, in the March number, subjects the report of the Section on Literature and Nomenclature, given at the last session of the American Dental Association, to severe but deserved criticism. He affirms of the report that "in addition to the general faults of incompleteness and inaccuracy * * in several of the matters it touches upon, it teaches false doctrine." He cites numerous instances from it to prove the assumption, and carries every one of his points almost with cruelty to at least one of the essayists for that section. For one reason or another, the methodical study of subjects is a failure. It is generally so. It has scarcely ever been tried without unmitigated disappointment. There is a kind of inertness among the best of dentists which makes them careless of precision of statement, and reckless of exact definitions. But few will explore a subject any way; and so it happens that the chairman of a section is generally obliged to come before a convention for utterances for his section with ill-prepared and inconsequential papers.

M.

EL PROGRESO DENTAL DE LA HABANA.

We acknowledge the receipt of the "Enero-Febrero" ('84) number of the above journal, and hasten to offer our thanks for the same, and to promise a quick return of the compliment. While its contents are as a sealed book to us, its language suggests in this cold climate a warmth and comfort that takes us in imagination not only to its West Indian home of publication, but to the fair land of Ferdinand and Isabella—even to Spain. "Aye, Spain! Land of the fragrant garlic and home of the sentimental olive! All I've eat, Olivette, Olive oil!"

DENTAL MEETINGS.

NEW YORK.

The Dental Society of the State of New York will meet at Albany, Wednesday, May 14th, at 10 o'clock. The programme, copies of which will be mailed to members of the State and District societies as soon as possible, is in preparation. Present indications are that there will be a very full attendance, and the proceedings of more than usual interest.

The meeting of the Board of Censors occurs Tuesday, May 13th, the day before the meeting of the Society. Those who contemplate appearing before this body for examination for the degree of "M. D. S." should inform themselves before going to Albany as to the requirements of the Board, and thereby save themselves the trouble and expense that some candidates have brought upon their own heads and pockets by going up misinformed and but half prepared. For the necessary information, which will be sent only on personal application, prospective candidates should address the Secretary of the Board, Dr. Frank French, Rochester.

DISTRICT SOCIETIES.

The 1st meets in New York, Tuesday, May 6th; the Vth in Utica, Tuesday, April 8th; the VIth in Binghamton, Tuesday, May 6th; the VIIth in Rochester, Tuesday, April 29th; the VIIIth in Buffalo, Tuesday, April 15th. The regular call of the Vth is out; also the preliminary call of the VIIIth.

OTHER SOCIETIES.

The Mad River Valley Dental Society will hold its annual meeting at the Phillips House, Dayton, Ohio, Tuesday, May 20th. For particulars address Dr. W. H. Sillito, Xenia, Ohio.

The fifth annual meeting of the Alabama Dental Association will be held in Birmingham, Ala., April 8th to 11th. One whole day, the 10th, will be devoted to demonstrations in operative, mechanical and surgical dentistry.

OPEN LETTER TO DISTRICT MEMBERS.

My Dear Sir: In answer to yours of date permit me to say that your copy of the Transactions of the Dental Society of the State of New York has been with your district secretary two months, and more. He will undoubtedly forward it to your address on direct appeal by mail. Yours, etc.,

CHAIRMAN OF COMMITTEE OF PUBLICATION.

WANTS TO BUY A DIPLOMA.

We have just been handed the following, which we publish verbatim less the name:

SAN FRANCISCO March 4 1884

DAVIS & LEYDEN

Dear sirs: I am a Dentist of 8 years practice could you tell me from what College I could buy a Diploma

P. S. Where can I buy one

We cannot answer these questions on a moment's notice, not having the address of the college that disposes of the goods called for on the terms stated. A few years ago it would have afforded us great pleasure to refer this anxious inquirer to that prince of diploma makers, the late lamented (he's in jail, therefore dead to the world) Buchanan; but in his enforced absence, we are under the painful necessity of referring him to a diamond edition of this celebrity, one Morrison, the head and front of a concern chartered as a dental college by the great and growing State of Wisconsin, and which sells its pelts to all comers at about \$12 each. We say "about," for the price is subject to the state of the market.

WHAT DOES HE MEAN?

A correspondent calls our attention to something that he says concerns us and which appeared in the February number of a journal called the *Independent Practitioner*. He says "it was a hard hit;" that he "would n't 'Bear-it'"; and something about winding a line about somebody's neck and "choking him till he looked red in the face," etc., etc. What was a "hard hit"? Whose "neck"? What does he mean? It strikes us our correspondent, who, by the way, passes for an intelligent man among his fellows, is remarkably incoherent. He talks like a man who has just got up from an English dinner, or returned from a three or four days dental meeting.

However, thinking there might be something in his suggestions worth following up, we turned to the *Dental Practitioner* for February, and found—nothing of the kind. This fact, coupled with the reference to the *INDEPENDENT Practitioner*, convinces us that our correspondent is not himself—has not been for some time. As for the *INDEPENDENT Practitioner*, we have never heard of such a journal.

 ARCHIVES OF DENTISTRY.

Three months ago we recorded in a rather hasty manner the demise of the *Missouri Dental Journal*. Now we record as deliberately as possible its resurrection under the name and style of the *Archives of Dentistry*. The make-up is quite familiar, and brings to mind the *Missouri Dental Journal* before its migration to Kansas City.

As yet the *Archives of Dentistry* has no editors; but the hand of its editor of other days is so conspicuous throughout its pages, that he might just as well have written the well-known "C. W. S." at the end of every article in it, which he could have done, and without making his labor any more evident. We hope to see it prosper; become a dental Braithwait, so to speak, and thus fill a place until now unoccupied by anything in the whole field of dental journalism.

 •••

 BEREAVED.

Dr. Carl Heitzman, so well and favorably known personally to many of our profession, and by reputation to all readers of dental literature, has recently been called upon to mourn the loss by death of a member of his family, a bright and accomplished daughter of fifteen years. He has the sympathy of all who have heard of his loss, and particularly of those who had met this "idol of the household," and have experienced in their own families a like bereavement.

 --

 PERSONAL.

Dr. Charles Kingsley, of Paris, France, announces that upon the dissolution (March, '84) of his copartnership with Dr. J. W. Crane, he will remove to rue Auber, three doors from the rue Scribe.

Dr. John D. Maynard, of this city, has announced his attention to sail this month for Paris, where he will be associated with Dr. J. W. Crane. The VIIth District Dental Society and the Rochester Dental Club lose an esteemed member, and the others of us a good fellow.

Dr. C. F. W. Bodecker goes to Europe the coming season for rest, recreation, and a visit to the "scenes of his childhood's days." May he have a good time—for he deserves it.

Dr. E. A. Royce, of Le Roy, N. Y., has gone to London, Eng., where he will assume full charge of Dr. John W. Pritchard's laboratory. His brother, Dr. W. E. Royce, formerly of Brockport, N. Y., has been with Dr. Pritchard for several years as first assistant in the operating department.

 •••

 DIED.

Suddenly, at Herkimer, N. Y., September 3d, 1883, Dr. CLINTON CHATFIELD, aged 66 years.

PELLETS.

Osteoclast.—“One of the finest.”

Scald or scold, hot water or tongue.

Science, published weekly at Cambridge, Mass., is worth double its cost.

Dolce far niente.—Swinging your best girl in a hammock, and tickling her nose.—*Life*.

The bulletin board of a leading medical college in New York says : No women need apply.

What shall we call the dog? Call him off. What shall we call the baby? Let us have Peace.

We are under obligations to Dr. W. H. Sillito, of Xenia, Ohio, for certain little favors.

“Over eight hundred doctors in this city (N. Y.) are studying German.” In five weeks?

Nothing great was ever achieved without enthusiasm.—*Emerson*. Just so; but who'll supply the fuel?

Blobson speaks of the butterine manufacturers as a great and growing oleogarchy.—*Boston Transcript*.

The *Dental Register* for January came out in a lemon-colored cover. It has since reverted to the dress worn last year.

The *Dental Review* is the name of a monthly just issued by W. G. Ashton, Charlotte, Mich. It's extremely “newsy.”

“A number of dogs were shot in the East End last night,” says an Ohio paper. Served them right; next time they'll know enough to keep that end out of danger.

WANTED.—The name of the idiot who first suggested to plastic-filling makers that they cut off the cork of the bottle containing the liquid.

Also the name of the man who knows how to make gold clasp—the kind known to the fathers of dentistry, and that springs like steel. We fear he died soon after the advent of rubber.

Also, the reason that most manufacturers of zinc cements supply packages containing liquid and powder in the proportion of one of the former to three of the latter?

An old lady, hearing that John Bright contemplated visiting this country, expressed the hope that he wouldn't bring his disease with him.

The attention of the profession is hereby called to the fact that the peanut industry is about to "boom," and that "peanut flour" is even now in market. This ought to be important news, particularly to the dentist who builds teeth of such materials as lacto-phosphate of lime, brown bread and oat meal. Hail peanuts!

"Fred," said the doctor to his assistant, "what's become of that book of number sixty foil?" Fred.—"It's—I don't know—guess it's evaporated."

Let it be recorded that on Feb. 25th, 1884, the Court of Appeals of the State of New York so far forgot itself as to sit in petticoats. "Unsex me here!"

In her late book the Queen says "such" and "so." For example: "Dr. McLeod gave such a splendid sermon on war." And again: "Brown was so distressed."

A writer points out the "verbal pitfall" into which many fall, of speaking of malaria as though it were a disease instead of a cause of disease.—*Medical Record*.

"Oat meal without the oat" is said to be the latest addition to the poor-house bill of fare. It must be first cousin to "first creamery" butter from the lard factory.

The publishers of this journal have a few more copies of Dolley's translation of Engelmann's "Physiology of Protoplasmic Motion," which may be had, post-paid, at fifty cents per copy.

For the use of the cuts to illustrate Dr. W. H. Rollins' article "On the Use of Flexible Disks," we are indebted to the publisher of the *Dental Cosmos*, in the March number of which the article first appeared.

A brief notice of Alcott's "Tea and Coffee" by a local newspaper concludes as follows: The tangents taken by medical and dietetic cranks that lead to nowhere are numerous, and the anti-tea-and-coffee tangent is one of them.

An exchange says: "We wish that people would learn that the proper name is 'Smithsonian Institution,' not Institute."

So do we. The next man who says "Institute" will have his name stricken from the subscription list, and his advertisement sent to the journal that's always a day late.

A small boy in school was asked to name some part of his own body. He thought a moment, and then replied, "Bowels, which are five in number—a, e, i, o and u, and sometimes w and y."

Prof. W. H. Dorrance, of the Dental College of the University of Michigan, attaches teeth to stamped aluminium plates by means of Watt's metal. The *Dental Register* pronounces the work "beautiful."

"Alkalay vs. Alkalay" is the tittle of a very exciting divorce case now pending. Considering the progress chemistry has made, it seems strange to find so much caustic in trouble when just a little acid would neutralize it.—*Life*.

CREPUSCULOUS.—Amateur tenor (just from Paris): And have you never heard of Gounod's "Crepuscule"?

Unmusical young lady: O dear! No, how dreadful; is it anything like spinal meningitis?—*Life*.

She: Why, cousin Charley, what are you doing here? I suppose I must call you Doctor, now; and how are the patients, by the way?

He: I don't know how they are by the way. I know none of them ever get as far as my office.—*Life*.

TO REMOVE WATER FROM ALCOHOL.—If gelatine be suspended in ordinary alcohol it will absorb the water; but as it is insoluble in alcohol that substance will remain behind, and thus nearly absolute alcohol may be obtained without distillation.—*Medical Record*.

Dr. W. H. Dorrance contemplates placing on the market a quantity of his alloy for making gold solder. We speak from personal experience when we say that solders made according to his formulæ flow like wax and hold their color perfectly.

An ornithologist has discovered that to have an appetite proportional to that of a robin, a man would have to devour daily a string of sausages sixty-seven feet long and nine inches in diameter. Make a "bob-o-link" of himself, in fact.—*Boston Courier*.

The Trustees of the College of Physicians and Surgeons have elected Dr. John C. Dalton, for so many years Professor of Physiology, President of the College, in place of Dr. Alonzo Clark, who has resigned. Dr. John G. Curtis now holds the Chair of Physiology.

Dr. Frank French has been named to write the local history of the dental profession for the forthcoming centennial history of the City of Rochester. Let us not forget to remember that it will be well done. P. S.—He has declined. Dr. F. F. Wilson will do it.

BIGGER PELLETS.

Miller, (W. D.) rises at five o'clock in the morning, goes to his studies at the chemical laboratory, where he works until nine, when his professional labor begins, which lasts till four, with one hour intermission for lunch. At four o'clock he is off again to his studies until (sometimes) midnight, forgetting the "whole world and the rest of mankind."

That is the way such men are made ; they must study, work, investigate. No matter how much talent a young man may possess, if he does not cultivate it, it will bear no fruits. The secret of the success of men like Miller is a simple one. It is work, work, work.—BLOUNT, *Independent Practitioner*.

According to Proctor, Sir Edmund Beckett, "a masterly reasoner within certain lines," has gone out of his way in the *Edinburgh Review* to attack Herbert Spencer, "the Bacon of his day," misquoting, misinterpreting, and otherwise attributing to the latter thoughts and modes of expression he has never entertained.

One of two things will happen Sir Edmund ; either he and his effort will pass unnoticed, or he will be picked up and shaken as a dog shakes a rat.

Dr. J. H. Beebe, of Brockport, N. Y., gives the following as a new method of testing amalgam for shrinkage: Place a fibre of linen or cotton in a cavity in a piece of porcelain, allowing one end of the fibre to hang over the edge. Now fill the cavity with the amalgam to be tested, and immerse the porcelain in an alcoholic solution of analine red. If the amalgam is non-shrinking the coloring material will not find lodgment between the filling and the wall of the cavity, but will merely follow the fibre to its end.

As an improvement on Dr. Beebe's method we would suggest the placing of the cotton fibre in the bottom and at the sides of the cavity, without, however, "allowing one end of the fibre to hang over the edge." The conclusion at the close of the experiment would then be: Stained cotton, shrinking amalgam ; unstained cotton, non-shrinking amalgam.

Citizens of Tombstone took a murderer from the jail a few days since, and dropped him from the cross-tree of a telegraph pole. The verdict rendered by the coroner's jury ran as follows: We, the jury, find that the deceased came to his death by emphysema, which might have been caused by strangulation, self-inflicted or otherwise.

The extensive chemical works of Powers & Weightman were considerably damaged by fire the night of February 28th, but not to that degree that will interfere materially with their business. Quinine and morphine, of which they were large manufacturers, have advanced very materially because of the fire, and promise to reach a much higher figure.

DR. S. C. BARNUM,
104 West 45th Street,
New York.

That's the address, and while it's before your eyes inclose in an envelope that little money order, payable to the man which his name it was Rubber Dam.

English dental journals are advertising an attachment which "entirely does away with the noise usual on liberating nitrous oxide from the iron bottles; it also prevents the bursting of bags, as the flow of gas is regulated and completely under the control of the operator." They call it "The Quieter."

Dr. Edward S. Peck, of this city (N. Y.), has just given a course of lectures on the anatomical and clinical relations of the eye and ear to the teeth, at the New York College of Dentistry, Second Avenue and Twenty-third Street. The present class numbers about one hundred and twenty-five students, of whom nearly sixty will present themselves for graduation at the coming commencement.—*Medical Record*.

"Abbott's Scissors" are needed by every dentist who knows, or is likely to know, anything of the delights that accompany the removal, by means of the lancet, of gum-tissue from the tops of erupting third molars. It is not many years since that we inflicted a little hacking of this kind upon a gentleman who had tried hard to cut his teeth the natural way, and he so far forgot himself as to remark "damn." We didn't know then what he meant, but we recall the fact that he wore a very bad look about the eye.

The Medical Bulletin for December contains a clinical lecture by Prof. Roswell Park, of the Medical Department of the University of Buffalo, on amputation above the knee-joint, ex-section of the upper end of the humerus, and gunshot wound of the head. We mention it for the purpose of remarking that the university has evidently found a worthy successor of the venerable and esteemed Prof. E. M. Moore, Sr. Prof. Park's lecture reads "like a book," being direct, incisive, self-confident and antiseptic.

A little girl knelt down to pray
 One morn. The mother said,
 "My love, why do we ever say,
 'Give us our daily bread?'
 Why not ask for a week or more?"
 The baby bent her head
 In thoughtful mood toward the floor.
 "We want it fresh," she said.—*American Miller.*

TWO JOURNALISTS ON KISSING.—The Douglas Jerrold of a Yonkers paper having stated for the entertainment of mankind that "the reason kissing is so pleasant is because the teeth, jawbones and lips are full of nerves, and when the lips of persons meet an electric current is generated," the Richard Brinsley Sheridan of *Peck's Sun*, remarks: "Yes, and its so confounded cheap. You don't have to have a dynamo machine, nor a battery in the house, nor a call-box, nor a button to touch to ring-up the central office, and there is no patent on it, and the poorest person in the world can enjoy the electric current better than the millionaire, and it never gets out of order. If Edison had invented kissing it would cost \$100 a year, like the telephone, and then extra kissing would be charged up extra, and if you didn't pay for it they would take out your kissaphone and disconnect you from the central office."—*Exchange.*

A POINTED ■.—This ■ was intoded 2 b as sharp as a † & without ¶. But the * of its destiny burned not brightly, being of low °. Its w8 is short, 4teen lbs to the ounce and scant. \$ously we speak of this, our ½ tame ... for well we know we o 2 write like 6o & with clever 7-8. But it is un?ably a chilly day when we get —, and 2day is a chilly day @ our mind is not — for ~-ing the fleeting th0s and reducing them to witty !! or sage remarks. Hence we send this 4th upon the journalistic C with no further (tical remarks, but with the sad expectation of its coming back home again to roost shivering & un' '.—*Rose's Toothpick.*

MICROSCOPICAL.

For a good swab for cleaning small vials, test-tubes, etc., use a piece of the round leather belting sold by dealers in sewing machine supplies.

Give me these two factors (organic acids and fungi), and I can produce caries which will deceive the most experienced operators and microscopists.—*Miller*.

Dr. W. B. Carpenter's fully illustrated contribution to volume XVI of the *Encyclopædia Britannica*, entitled "Microscope," fills nearly twenty-two pages of the edition published by Stoddart. It is a monograph of the subject, and by a master.

In the advertising pages of the *Journal of the Royal Microscopical Society* we read that "Charles Cappock, whose partnership with R. & J. Beck has ceased by effluxion of time, will continue his business," etc. "Effluxion" is a good word, but in this connection and at this distance it wears a very odd look.

To keep the Wenham button or the common hemi-spherical lense in position while examining temporary mounts, fix it with glycerine or immersion fluid to that surface of a slide on which has been turned a wax or an asphalt ring, the internal diameter of which corresponds to the diameter of the lense. Invert the slide and it is ready for use.

It is stated that by planting *Deutzia scabra* (the under surface of the leaves of which are so familiar to "show" microscopists) near grape vines, the latter can be protected from the ravages of the rose bugs, as these insects prefer the flowers of that plant to the grape.—*Exchange*.

Many dentists grow grapes (good business it is, too), hence the above.

If you have neither bottle nor preserving fluid in which to keep moist specimens until you reach your histological den, wrap them in the waxed or buttered paper so generally used by confectioners; and, by the way, they have the same object in view, namely, the prevention of rapid evaporation of moisture, and consequent drying and destruction of the goods.

It affords us great pleasure to call attention to Mr. Ed. Bausch's article on "Eye pieces and Objectives." It's a simple story, exceedingly well told, and crowded with points, many of which one would look the books through in vain for. Of course it is by an expert, the writer being the presiding genius of the microscopical department of the Bausch & Lomb Optical Company, of this city.

For the study of many points in the growth and development of the several tissues, dogs or cats, either of which may be had of the desired age at any time that one may need them, are as good as the human subject—perhaps better, as they may be slain to order and pickled while fresh. The following, which is tabulated from a statement by Heitzman, gives the age at which the development of bone (and of the other tissues to a given extent) corresponds:

DOGS OR CATS.	MAN.
At birth	about $4\frac{1}{2}$ months (intrauterine).
About 1 year	about 20 years.
From 10 to 12 years	about 60 years.

Scientific and Literary Gossip says: Prof. J. H. Pillsbury has devised a neat plan for storing microscopic slides. Taking the ordinary boxes with saw scarfs to hold the slides, he makes a case to hold ten or twenty of these boxes standing on the end, and on the outside of each box pastes an index label giving the contents of each. The special merits the plan lie in the compactness, and in fact that each slide is kept in a horizontal position. Milton Bradley & Co., of Springfield, Mass., make

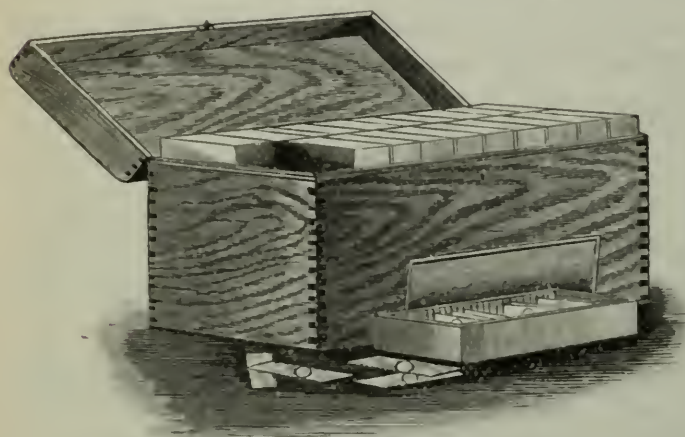


Fig. 1.



Fig. 3

the cabinets for the trade, and charge for those holding 250 slides \$2.50, and for 500 slides \$3.50. See Fig. 1.

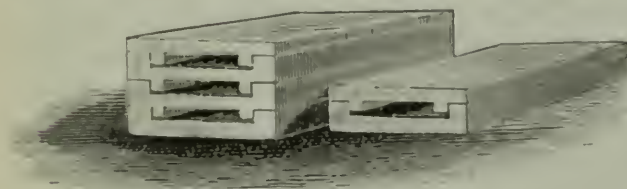


Fig. 2.

Fig. 2. illustrates a new mailing box, shown in section in Fig. 3, for mounted objects. It is made by the same firm.

CARBOLIC ACID AN ALCOHOL—A PRESERVATIVE AND MOUNTING MEDIUM.

Pow points out that contrary to the general opinion, carbolic acid is not an acid, and has no acid properties whatever. Chemically speaking it is an alcohol, belonging to a series of alcohols quite different in composition from common ethyl-alcohol, and from wood spirit, which is closely related to common alcohol. But carbolic acid is, nevertheless, a true alcohol, and for this reason it can be frequently substituted for ethyl-alcohol in microscopical work. One great advantage which it has over the latter is found in the readiness with which it penetrates the specimen, and mixes with the fluids used in mounting, such as water, glycerine, and Canada balsam. Another is, that it does not harden tissues and make them stiff. * * * The acid used for mounting should be the strongest solution, having just enough water in it to keep it fluid at ordinary temperatures.—*Journal of the Royal Microscopical Society*.

BOOKS, PAMPHLETS, PERIODICALS.

DAS WISCONSIN DENTAL COLLEGE. Von Dr. Adolf Petermann. Pp. 4. Also.

KEINE NARKOSEN—OHNE ZEUGEN. Von Dr. Adolf Petermann. Pp. 16.

MERITS AND CLAIMS OF ARTIFICIAL CROWN-AND BRIDGE-WORK. By J. L. Williams. Reprint. Pp. 16.

TRANSACTIONS OF THE OHIO STATE DENTAL SOCIETY, 1883. Pp. 50.

MICRO-ORGANISMS THE ESSENTIAL FACTOR IN DENTAL CARIES. By C. T. Stockwell. D. D. S. Reprint. Pp. 9.

CIVILIZATION NOT THE CAUSE OF TOOTH DECAY, etc. By J. J. R. Patrick, D. D. S. Reprint. Pp. 37.

SOME POINTS IN ORAL SURGERY, etc. By Geo. L. Parmele, M. D., D. M. D. Reprint. Pp. 11.

CONCERNING RECORDS. By Geo. L. Parmele, M. D., D. M. D. Reprint. Pp. 13.

PROCEEDINGS OF THE AMERICAN SOCIETY OF MICROSCOPISTS. Sixth Annual Meeting. Chicago, Ill., August 7th to 10th, 1883. Pp. 275.

A splendid report of the doings of this young but vigorous body. It

reflects great credit on the committee of publication, Messrs. Killicutt and Fell, of Buffalo, and Cox of Cincinnati.

WOMAN. By Norman W. Kingsley, D. D. S. An oration delivered before the American Academy of Dental Science, Boston, Mass.

Our copy is keeping Lent. It is returned by our lady friends only to be picked up and carried off again and again by others. There is much in it that "takes."

TRANSACTIONS OF THE ILLINOIS STATE DENTAL SOCIETY. Nineteenth Annual Meeting, 1883. Toledo: Ohio State Journal of Dental Science. Pp. 152.

The above came too late for review. Its contents, wholly or in part, have appeared in the *Ohio State Journal of Dental Science*. It is one of the best "Transactions" we have seen, and gives evidence in every page of the fact that the Society is thoroughly alive to its own needs and those of the profession.

VULCANITE AND CELLULOID: Instructions in their Practical Working for Dental Purposes. By S. Eldred Gilbert, D. D. S. Philadelphia: The S. S. White Dental Manufacturing Company. Pp. 116.

According to the preface, "The aim of the author in the production of this volume has been to present the subject-matter as concisely and plainly as possible, as the work is designed especially for the use of students." He seems to have succeeded in what he started out to accomplish; and though "designed especially for the use of students," many who have known vulcanite and celluloid since their introduction will find in these pages many things of value, knowledge of which frequently helps one over rough places. The index, which fills eight pages of a small book, is an excellent one. We commend it to all who are working the materials in question.

TRANSACTIONS OF THE AMERICAN DENTAL ASSOCIATION, AT THE TWENTY-THIRD ANNUAL SESSION, 1883. Pp. 118.

Probably the most important subject discussed by this society at Niagara Falls last August, was that about the mischief of multiplying degrees, with criticisms on the sources from whence such degrees are obtained, and some incidental disputes on the differences between diploma, license and certificate. But the remarks by some of the speakers did not equal the clearness of idea and precision of statement given in the resolutions that were passed unanimously. The resolutions read as follows:—

“ *Resolved*, That the interests of the profession and advanced dental education both demand that all dental educational institutions shall require that every student, before being admitted to examination for the degree of Doctor of Dental Surgery, shall have taken two full courses of lectures.

“ *Resolved*, That the American Dental Association deems it adverse to the interest of the dental profession for any State Board of Examiners to confer a title or degree of any nature.”

The question thus decided by the National Society was a large one, and somewhat complex, from the conditions in which dentistry has had a growth in respectability from the beginning. We have an opinion that the resolutions were urged upon the Convention, and dismissed too peremptorily. There are phases in the question which involve State Rights. It is not a question how dental colleges shall govern, but how a State shall have the right to regulate in any form the practice within its own boundaries on its own terms. It does not appear from the discussion that the Board of Censors of the State of New York is incompetent to its business, or reckless in the distribution of its sanctions. On the whole, the action of the National Society was respectful to New York ; but the last question of degrees is still in abeyance, if weaker than before. M.

TRANSACTIONS OF THE DENTAL SOCIETY OF NEW YORK, Fourteenth and Fifteenth Annual Meetings, 1882-3. Pp. 243.

The Dental Society of the State of New York at last proves itself an *entity*, and not a *myth*, as many had begun to suspect it was, from the absence of any published reports of its proceedings for two or three years. What it did in those sessions—at least of '80 and '81—is as vacant to the general reader as if the society never had an existence. Whether the society was enduring what may have been an *interregnum* or not, whatever obstacles it encountered and did not overcome, the effects were certainly mischievous on the great body of dentists in their opinions of it. But, indeed, the career of this society has been characterized by torpor rather than enterprise in reporting itself. It has seldom published an account of its doings under two years from the time they were done, delaying with inexcusable negligence to put in its blows seasonably and with the best effect. Much of its work has been an after-clap on matters that had received a seasoning from other sources months before the society had a word to say in print about

them. But the modern idea of greatness is not apt to be associated with that of ponderousness, or that large bodies must necessarily move slowly. The genius of the age, in fact, rejects the thought, that anything is great simply because it is unwieldy, or dignified because it is slow. It knows that that sort of inertness often betrays weakness rather than strength; and the Dental Society of the State of New York may well take a lesson from the work doing by smaller, but more energetic organizations.

The treasurers' reports for 1882-3 show a gratifying condition of the finances of the society. In '82 the amount in hand, after deducting all expenditures, was \$671.77; and in '83 the balance had increased to \$949.16.

The board of censors in '82 examined six candidates for the degree of M. D. S., and rejected two; in '83 nine candidates presented, and but three passed the examination. Whatever the differences of opinion in regard to the multiplication of designations meaning essentially the same thing, there can be no question about the ability and integrity of the State board of censors. A person who can withstand their examination, would doubtless rank high among the graduates of any dental college.

The report of the secretary was exceedingly brief, and ended with these very significant words,—“and finally, our duties have been discharged in a manner quite consistent with circumstances at once unsatisfactory and extremely annoying.” This was an exceedingly temperate and modest allusion to the almost insurmountable obstacles he encountered in the first year of his office. But his work was well done in spite of them.

The list in the appendix of the registered practicing dentists in the counties of N. Y. is imperfect, because it does not include the names of some who registered under the Supplementary Act, extending the time for registration. No doubt there was a good deal of mischief in that business. In the reports on the subject we are told of those “having registered not only actual, but prospective students, *and even young children.*”

The work of the publishing committee is uncommonly well done. The paper is unusually good and the type fine and clear. No one will object to the volume for its appearance, and certainly not for what it contains.

M.

THE ODONTOGRAPHIC JOURNAL.

VOLUME V.—*July*, 1884.—2.

DENTAL SOCIETY OF THE STATE OF NEW YORK.

SIXTEENTH ANNUAL MEETING.

FIRST DAY—MORNING SESSION.

GEOLOGICAL HALL, ALBANY, }
May 14, 1884.

The Dental Society of the State of New York met as above, and was called to order by President L. S. Straw.

W. H. Atkinson, by request of the President, invoked the divine blessing.

The roll of permanent members was called by the Secretary, the following answering to their names: J. G. Ambler, F. L. Ames, W. H. Atkinson, A. H. Brockway, E. C. Baxter, C. Barnes, W. C. Barrett, Wm. Carr, C. D. Cook, W. H. Colgrove, M. E. Elmendorf, C. E. Francis, S. D. French, F. French, O. E. Hill, L. E. Ireland, Wm. Jarvie, Jr., N. W. Kingsley, Geo. E. Lamb, J. Edw. Line, H. G. Mirick, F. D. Nellis, S. B. Palmer, J. N. Race, L. S. Straw, C. E. Stacks, A. P. Southwick, C. K. Van Vleck, and W. F. Winne.

The following delegates from district societies reported themselves at the Secretary's desk. or were so reported by the Committee of Arrangements: E. Parmly Brown (II), A. P. Burkhart (VII), Frank B. Darby

(VI), Nelson B. Gregory (VI), Jas. H. Holly (II), G. W. Hoysradt (VI), Chas. F. Ives (I), Myron D. Jewell (VI), B. T. Mason (V), James J. Mills (II), John J. Pitts (II), M. L. Rhein (I), C. C. Smith (V), E. L. Swartwout (V), Wm. W. Walker (I).

Many others were present, but the fact of attendance was not officially obtained.

The minutes of the Fifteenth Annual Meeting were read by the Secretary, J. Edw. Line, and approved as read.

The Committee of Arrangements, through its chairman, W. F. Winne, reported the following, which was on motion adopted :

The Committee of Arrangements would respectfully report that it engaged Geological Hall for the meeting of the Board of Censors on the 13th inst, and also for the meetings of this Society on the two days following. It has also had printed one dozen show cards. It has moreover examined the credentials of the following delegates, found them correct, and hereby recommends the following for membership :

First District—Wm. W. Walker, four years (vice W. D. Tenison); Chas. F. Ives, four years (vice G. W. Weld, whose term was finished by F. M. Odell).

Second District—James J. Mills, four years (vice C. W. Harreys).

Sixth District—N. B. Gregory, four years; Myron D. Jewell, four years (vice C. W. McCall).

Seventh District—A. P. Burkhart, three years (vice R. N. Hudson, resigned).

[Signed] WM. F. WINNE,
EDWIN C. BAXTER,
F. LEGRAND AMES,
Committee.

Members of the Society were requested by the President to call at the Treasurer's desk and make themselves good on his books.

The President then delivered the

ANNUAL ADDRESS.

GENTLEMEN:—Called again to preside over your deliberations, it is but proper that I should return thanks, emphatic and sincere, for the confidence you have reposed in me this second term, while, at the same time, I welcome you to another annual gathering, and congratulate you upon the continued prosperity and the increasing usefulness of our organization. It gives me pleasure to address you as members of the "Dental Society of the State of New York," and claim

for you meritorious praise at the hands of the respective communities that you here represent. You have sacrificed home comforts and professional emoluments to meet in social harmony, to maintain the dignity of our State Dental Laws, and to do all in your power towards the diffusion of knowledge in and of our specialty. Through you, as representatives, the ball must be kept rolling to the encouragement of diligent investigation and attentive research, that 'er long the fullest respect and the most honorable consideration may be obtained for our chosen profession. The increasing call for dental services of a high order, with a corresponding appreciation and willingness on the part of our patients to pay for the same, should demonstrate to us that soon no coin, unless stamped with the monogram of "high attainments," will pass current, and no high charge for services will be willingly paid unless there is a *quid pro quo*. The encouragement and support offered us to day by the public, are beckoning us on to still greater attainments in the field of thought and investigation. There is one great subject upon which all peoples, wheresoever dispersed, need the illumination of an electric blaze, so bright, so clear, that all may see and understand. I refer to the cause and prevention of this wide-spread decay of teeth, and I feel most impressed with this one idea, that the profession could not better fulfill its mission than by devoting itself heart and hand to the great educational work of how best to fight this fell destroyer, in the interests of those who suffer and daily fill our chairs, and contribute to our purses. The time has come when philanthropy should be emblazoned upon the door plates of doctor and dentist. Law and divinity never did and never will instruct their followers how to live in order to enjoy physical integrity here below ; it comes not within the scope of their teachings. But the physician at large and the dentist as a specialist, should make themselves felt as dispensers of that knowledge which will guide the erring into paths of rectitude and happiness,—should inaugurate a day of scientific investigation, and thereby create a stampede towards the goal where prevention more than remedy holds sway. The dentist who is educated, and who is faithful to himself and his calling, can, at intervals, give many a private and instructive lecture to his patients, and send them away with an unmistakable gratitude beaming from every feature for the truly professional manner in which they have been treated.

If men who understand the real needs and short-comings in our present school systems could constitute our boards of education, a great tidal wave of "how to live" would 'er long be washing the shores

and bluffs of present ignorance and unbliss. I say most emphatically, educate the rising generations in the theology of all that concerns brain and muscle, and the true theologian will see his task made easy and the world suddenly grown better, wiser and happier. Rampant luxury and debasing habits of all kinds, would give place to high morals, and a smooth physical running gear would be the sure result. Neurasthenia would cease to glare out through the portals of almost every soul in the land, and a normalnerve-force would come in to yield a grander man. Much has been done within the last fifty to a hundred years to alleviate human suffering, by both the physician and the dentist, especially the latter; but there is much left for us yet to do before we can expect to bring all man and womankind to a knowledge and observance of the laws given for their guidance by an all-wise Being. Let us all work and strive towards the attainment and dissemination of knowledge, and greater light for ourselves and patients, and a majestic reward will surely come.

In the application of all this to our profession, I am every day more and more convinced that it becomes our paramount duty to insist upon a broad, basal and advanced culture in every man who enters our domain, for thereby only can he be graduated with a trust in himself and a value commensurate to the needs of any community, and an honor to dentistry. It may be truthfully said that "an educated brain and an educated hand contribute, with most generous certainty, to the happiness and wealth of any country." Shall we be one whit behind in adopting this sentiment as a guiding star and watch-word?

I had hoped that at this session our Board of Censors would be able and report good fruits of a fraternal and reciprocal state of feeling between the States which have boards of examiners, who may confer upon applicants a license to practice within their respective limits; but it seems that our degree of "M. D. S." was a stumbling block to the wisdom assembled at Niagara Falls, in August last. Whether it would be in the interest of our profession to recognize as valid any passport which might be conferred by these neighboring States, I am not prepared to say, and have no word of advice to give; but I may, perhaps, be allowed to suggest, that should other States refuse to receive as current our diplomas, we can well afford to remain within the borders of the Empire State, never again condescending to go out as missionaries to foreign and benighted fields. We are also to keep it in mind that we, as a State Society, have the right, conferred by law, to sit

in judgment upon diplomas brought from Wisconsin, Pennsylvania, or elsewhere, and decide whether or not their holders are entitled to recognition. Are there any other states in the Union which have reposed confidence enough in their respective State dental societies to confer upon them this privilege, this power, this warrant of censorship?

I have in my hands a circular letter addressed to the President and Members of the Dental Society of the State of New York, which I will read:

GENTLEMEN:—The foremost men of our profession admit the fact that the name of American Dentistry has not that world-wide recognition which its honor demands, and its history would warrant. In our opinion, this is an opportune time for a general movement to place it upon a basis commensurate with its dignity, and we venture to submit the outline of a plan for the purpose, which we think feasible, and which we hope will meet with your sanction and furtherance.

As a nation claiming to lead the world in the science and art of Dentistry, we should have one great representative body of the profession to speak forth with authority its aims, duties and attainments.

Let us, therefore, organize a National Dental Association of the United States, composed of delegates elected by the various State organizations, an equal number from each State, to meet annually, and always at Washington, D. C. Thus, we would give to Delaware the same voice as to New York. In order to always secure a full meeting, we would suggest six as the number of delegates from each State; a like number of alternates having been elected. Let the National Association elect a Board of Regents, one from each State, who shall control its meetings, setting the time, etc.

As important adjuncts to this Association, we believe it would be found expedient to establish an extensive library, to contain dental works and publications, standard and periodical, foreign and native; and the founding of a national museum, to illustrate the past, present and future of dentistry.

The wonderful benefit to the profession, and humanity in general, to be derived from these is certainly manifest to every intelligent dentist.

We are sure that room can be obtained in the Smithsonian Institute for the museum, and in the library of the Surgeon General's office for the library. We are equally sure that Congress will grant an appropriation for both purposes, as is done for the medical profession.

Mature deliberation at the meeting for organizing will suggest the details of the scheme, which we have not thought it necessary to go into here.

In conclusion, we would respectfully urge that you elect, at your present meeting, delegates, with alternates, to meet for the purpose of organization, at the time agreed upon by the chairman of the different State delegations.

Do this in anticipation of like action upon the part of other State societies; then forward to Dr. B. H. Catching, Atlanta, Ga., the name and address of your chair-

man, and he will act as medium of communication between the different delegations, informing each of the action of the other, thereby bringing about unity of action.

Yours respectfully,

FRANK ABBOTT, New York City.

J. E. CRAVENS, Indianapolis, Ind.

C. T. STOCKWELL, Springfield, Mass.

F. SEARLE, Springfield, Mass.

W. C. WARDLAW, Augusta, Ga.

B. H. CATCHING, Atlanta, Ga.

T. B. WELCH, Philadelphia, Pa.

N. B.—We do not propose by this to antagonize the existing National Association, but using it as a *nucleus*, build up a grand organization on the plan set forth above.

The movement suggested in this letter comes endorsed by good names, and I would recommend the election of delegates as set forth in the circular.

May I call your attention to the fact that the meeting of last May demonstrated how short a time is a two day's session, or rather a day and a half, nearly one-half of which is devoted to business. Can we not next year come prepared for a profitable re-union, which shall last two days and a half? And if the Committee of Arrangements will provide a smaller hall, with adjoining rooms for clinics and the exhibition of appliances, I feel justified in promising a larger and more enthusiastic attendance.

Allow me to close these remarks by proclaiming myself proud that I am your son by adoption, and stand firm in the belief that our heart pulsations are as one in the desire and determination to keep pace with the general advancement of all that is great as good.

The Treasurer, H. G. Mirick, presented the following report, which was referred to the Committee of By-Laws :

The Treasurer would respectfully submit the following as his report, showing the financial condition of the Society May 13th, 1884 :

Receipts.

Balance as per last report.....	\$949 16
Annual dues from District Societies	264 00
“ “ and admission fees from permanent members.....	253 00
“ “ from New York College of Dentistry.....	6 00
Diplomas	60 00
Interest from Savings Bank to Jan, 1, 1884.....	18 90
	\$1,551 06

Expenditures.

1883.			
May	10.	J. E. Line, per Resolution of Society May 10, 1882..	\$100 00
“	“	“ Secretary's bill.....	68 32
“	“	N. W. Kingsley—Whitney Memorial Prize	35 00
“	“	“ Expenses to Kentucky.....	70 42
“	“	Janitor's bill.....	15 00
“	“	Cartage	1 00
“	“	Error in B. R. McGregor's account (Brockway).....	3 00
June	6.	Postage	56
“	27.	C. K. Urquhart, Stenographer's bill.....	55 00
Sept.	26.	Chas. Mann, account printing Transactions, order of President	100 00
			448 30
		Balance on hand.....	\$1,102 76

H. G. MIRICK,

Treasurer.

Brooklyn, May 13, 1884.

The Treasurer also reported that the funds of the Society had been deposited in the South Brooklyn Savings Bank, payable only to the order of the Treasurer of this Society. This bank pays interest January and July 1st on balances which have been on deposit for at least three months previous to those dates. His report includes interest only to January 1, 1884.

The report called attention also to certain discrepancies in the list of permanent members, as published by the Secretary, and the list of qualified membership as it appears on the Treasurer's books.

The Society's Correspondent, W. H. Atkinson, announced that he had nothing to report.

The Board of Censors reported as follows, through its Secretary, F. French:

The Board of Censors begs leave to report that a meeting for the examination of candidates for the degree of "M. D. S." was held in Geological Hall, Albany, Thursday, May 13th, 1884, commencing at ten o'clock a.m. and continuing throughout the day.

Censors present—Kingsley, Jarvie, Jr., French (S. D.), Colgrove, Holmes, Palmer, Southwick, and French (F.).

Twelve candidates presented themselves, six of whom passed the examinations, and are hereby recommended for the Degree. The names are as follows:

John Jacob Mills, Poughkeepsie, N. Y.
 Lonedo Frazee, 63 Irving Place, Brooklyn.
 Albert M. Wright, Troy, N. Y.
 Herbert Allen, Gloversville, N. Y.
 DeWitt Barker, 383 Dean Street, Brooklyn.
 Linzey Marion Hall, Rome, Georgia. (425 Vith Avenue, New York.).

Two censors are to be elected this year in place of Wm. Jarvie, Jr., and S. B. Palmer, whose terms expire with this meeting.

FRANK FRENCH,
Secretary.

The report was received, and the several recommendations adopted.

The Secretary reported in substance as follows:

The duties of the Secretary, as such, for the past year have been unusually light and, except in a few instances, unimportant, as the following summary will show:

The diplomas awarded a year ago (three in number) were suitably engrossed, signed, sealed, and sent by express to their owners; circulars were procured for the use of the Society and Censors, and a copy of each mailed to members of this Society; also to certain members of neighboring societies, to dental journals, and, on application, to non-society members of the profession of this and other States. More or less correspondence has also been attended to.

[Signed] J. EDW. LINE,
Secretary.

The report was received, and a bill of \$42.02 which accompanied it, referred to the Committee of By-Laws.

The Committee of By-Laws asked, and was granted, further time in which to prepare its report.

The report of the Committee of Publication was presented by its Chairman, J. Edw. Line. Following is the report:

A year ago your Committee gave what were considered good and sufficient reasons for its failure to issue in printed form the proceedings then in its possession, and these reasons continued to hold good for the proceedings of '82 until

issued in the same volume with '83. It was said that an attempt would be made during the session then in progress to fill in the blanks in the Stenographer's report, and correct the numerous and more or less serious errors. That attempt was made, but failed of its purpose because of the press of other things incident to the meeting, and the inability of those appealed to to recall their remarks of the year before.

When the report of the meeting of '83 had arrived the Committee got together, looked it over, and pronounced it better than that of the year 1882. There were fewer omissions, and to the Committee the several lectures and the discussions read smoothly enough; nevertheless it was thought best to submit the lectures and the more extended discussions to those to whom the reporter had credited them. This was done. Two of the lecturers found it necessary to re-write nearly the whole of what had been sent them. The same thing is true of those to whom the discussions were sent.

Much of the discussion was overhauled by the Committee—made intelligible so far as the facts reported were concerned—and proof sent to the authors for correction. A quantity of this proof came back with few or no changes; much of it cut, slashed, transposed; and not a little was ordered out because irrelevant, incoherent, or a string of statements the very opposite of those made at the meeting. But in the course of time, and after much corresponding, mailing and remailing of manuscript and proof, the work was pronounced done—to the great relief, though not wholly to the satisfaction, of all concerned.

The trouble experienced with the discussions might have been obviated, and the transactions issued earlier and at much less expense, had the Committee followed the precedent of cutting out all that was likely to prove annoying to its members or expensive to the Society, rather than follow its first-formed determination to publish the whole of the discussions, leaving it to those who did the talking and to the Society itself to fight, if needs be, for their own and its right to preach and teach.

The distribution of the transactions of '82-3 was as follows, which differs somewhat from the plan first decided upon and which appeared in the *Independent Practitioner*: Packages containing copies according to the district membership reported in '83 were sent to the several district secretaries, with the request to mail a copy to each member, the outcome of which arrangement was that members of the State Society (who are also, and we believe necessarily, members of some one of the district societies) received but one copy each, unless for some special purpose and on direct application to the Committee. Copies were sent to a number of State organizations in return for copies sent by them; also to the dental journals of this country, England and Germany, and to the Surgeon-General's office.

The expense of the Transactions for '82-3 was great—greater than ever before, except perhaps when done by the State, when the bill was footed by the ever-solvent taxpayer. This great expense comes of the fine material used, the quality of workmanship (as indicated by the presswork, etc.), the quantity of small type used in the minutes for setting the reports, the appendix, and so on; but over and above all this, it comes of the many and extreme transpositions of matter of lectures and discussions, the complete cutting out of matter, the killing of whole reports of

cases which members failed to recognize as their own handiwork. In short, of pages many were set, but *some* were not used. The figures for the work are \$535.00 for 500 copies, or a trifle more than \$1 per copy, which will account for the care exercised by the committee in their distribution.

To off-set this great expense, the committee submits the following:

While the expense was great it has come to pass—

1st. That the Society has published and distributed its latest doings, and for the first time since were issued the Transactions of '77-8.

2d. These Transactions are in the hands of every society man in this State.

3d. Its papers, reports, discussions, have appeared entire or in part in nearly all American and several foreign journals, and are even now in course of translation for and publication by two of the German journals, and all duly credited to this Society.

4th. The Society has been placed in a position to exchange proceedings with other bodies, and thus advertise its existence and assert its usefulness, and *because* of this medium of exchange, is now better known to the profession, both at home and abroad, than at any other time in its history.

[Signed]

J. EDW. LINE,
FRANK FRENCH,
CHAS. BARNES,

Committee.

On motion the report was accepted, and the bill referred to the Committee of By-Laws.

The Committee of Business reported as follows:

Your Committee of Business would respectfully report that it has engaged the services of Wm. R. Lansing as stenographer, at an expense of \$64.00.

A supplementary report will be presented at the close of each session, giving the programme for the session following.

The Committee would also suggest that the conferring of degrees take place at the morning session.

[Signed]

M. E. ELMENDORF.
Committee.

The report of the Committee of Dental Law was read by its chairman, Wm. Carr. Following is the report:

The Committee on Dental Law would respectfully report that they were notified of their appointment September 13th, 1883, without any definite instructions from the State Society regarding the line of action to be pursued—whether to await charges from the different District Societies, or to proceed against illegal practitioners as they came under the notice of the Committee.

On January 9th, 1884, charges were received from a Committee of the Syracuse Dental Society against E. J. Taylor, who was practising dentistry in the city of Syracuse. He claimed the right to practise in this State by virtue of a certificate granted by the State Board of Pennsylvania, in which State he formerly practised.

He registered his certificate May 11th, 1883, in the County Clerk's office. The same month he presented himself for examination before our State Board, and was rejected. At the time that the charges were made he was pursuing his studies for the purpose of presenting himself before the Board at this meeting. After carefully weighing all the evidence in the case, and also consulting several members of the State Board, we concluded to hold prosecution in abeyance until he had another opportunity to qualify himself by examination.

The second charge was made January 10, 1884, against F. E. Howe, of the firm of F. S. & F. E. Howe, of Ithaca. Upon investigating this case we found that he registered while yet only an assistant, and this, according to the views of the complainant, did not legally entitle him to practise. After consulting legal advisers, we did not feel justified in taking action until the case had been presented to the State Society.

The third charge was made January 12, 1884, against Dr. W. H. Richards, of Friendship, N. Y. Upon inquiry we learned that Dr. Richards graduated in the class of 1863 from the Baltimore Dental College. He is a resident of California, in which state he is now practising. At the time that the charge was made, he was visiting friends at Friendship, and operated for a number of them. He intended to return to California within two weeks. The complainant was notified of these facts, and the case was dismissed.

Benjamin F. Tillyer, of 53 West 24th Street, was reported to the Committee as an illegal practitioner. He had been practising in the city for one year, claiming this right under a certificate granted by the State Board of New Jersey. When informed that the New York State Dental Law did not recognize the certificate of any State Board of Censors excepting its own, he expressed his willingness to conform to the requirements of the Law, and asked what course he should pursue. He was informed that he must first abandon practice, afterwards pass an examination, and receive a certificate of qualification from *this* State Board of Censors, or, graduate from a Medical or Dental College. He chose the latter, and is now a student in the N. Y. C. D.

L. M. Hall, of 425 Sixth Avenue, New York City, was recently reported to the Committee for investigation. He formerly practised in the State of Georgia. He had been practising in the city one year. When informed that he was practising illegally, he claimed ignorance of the law, and decided to abandon practice.

Upon examining the lists of registered dentists of the Cities of New York and Brooklyn, we find that in New York there are nine claiming to be graduates of the Wisconsin Dental College. They are: Emil Dunzelt, Johannes Dunzelt, Franz Herman Julius Koser, Franz Jockwich, all registered from 306 East 13th Street; Charles A. Heller, 328 East 119th Street, Fred Brueckner, 19½ Forsyth Street, Leo F. Hogle, 110th Street and Third Avenue; Theodore W. Allbright, 324 Ninth Avenue; and Adolph Faber, 362 Bowery.

Upon investigation we learn that Emil Danzelt and F. H. J. Koser are practising in Berlin. Johannes Dunzelt is practising in Dresden. Your Committee has already reported them to the proper authorities in Europe.

Franz Jockwich is yet at 306 East 13th Street, but he asserts that he has never practised under this diploma.

Leo F. Hugle was practising at 110th Street and Third Avenue, but upon being convinced that he was liable to prosecution, disposed of his practice, and expressed his intention to enter a Medical or a Dental College in the autumn.

Charles H. Heller, of 328 E. 119th Street, received an honorary degree while yet a student in the N. Y. C. D. He never practised under it, however, and has since graduated from the N. Y. C. D.

Fred. Brueckner, an assistant in an office at 159 Bowery, received an honorary degree, but has not practised under it. He is now a student in the Philadelphia Dental College.

Adolph Faber, of 362 Bowery, we believe holds an honorary degree. In an interview with the chairman, he agreed to abandon practice, and enter a dental college next autumn, if we would not prosecute him; but he has continued to practise, and recently sent a verbal message that he has no intention of accepting any of our propositions, but proposes to continue to practise as before.

Theodore W. Allbright, of 324 Ninth Avenue, received the diploma May 13, 1883, and registered August 4, 1883. Becoming convinced it was without value, and could afford him no protection, he entered the University of Maryland, and graduated in the last class.

Eberhard T. H. Risch, of 171 Seventh Street, Brooklyn, received a diploma of the same character for the sum of \$50. This man attended two courses of lectures in the N. Y. C. D. Wishing to expedite matters, he left this College, went to Delavau, Wisconsin, and there received the diploma. We called upon him, ascertained these facts, and decided not to prosecute until after the annual meeting.

This completes our investigation to the present time. We believe that the time has come when the Law should be rigorously enforced, and to this end we make the following suggestions:—1st. That the Committee on Law should be empowered to apply to the Supreme Courts of this State to have all the names of those holding diplomas of the Wisconsin Dental College erased from the registration lists. 2d. That this Committee be instructed to have printed, framed, and placed conspicuously in every dental depot in this State a copy of the Dental Law. 3d. That the Board of Censors be instructed to prepare and report at this meeting a list of all reputable dental and medical colleges, and have this list, together with the State Law, placed in the Registration books of every county in the State, with instructions that the County Clerk shall register only such persons as hold a diploma from one of these colleges. Also, that he be instructed to refer all others, for endorsement, to the State Censor of the district in which he wishes to register. Also, that the Chairman of this Committee receive a certificate of his appointment, signed by the President and the Secretary, and bearing the seal of this Society, before the adjournment of this annual meeting.

WILLIAM CARR.
CHARLES BARNES.
A. M. HOLMES.

The report was, upon motion of W. C. Barrett, accepted.

Wm. Carr : I will state that I went to the District Attorney's office to have the names of those holding Wisconsin diplomas erased from the Registration book, and found that they were ignorant of the existence of the Dental Law ; but they expressed a willingness to assist in enforcing it. They directed me to the County Clerk's office, and I there learned that we would be obliged to apply to the Supreme Court in order to have these names erased.

W. H. Atkinson : That we may act intelligently in this matter, I would say that it is within the knowledge of this Committee that there has been no justice whatever in the giving of these diplomas, even if they have been given properly. I therefore say if there are no legitimate degrees from that college, I am heartily in accord with the report of the Committee.

Wm. Carr : Nearly all who have registered under the Delavau diploma are Germans. We have been trying to find these men for several months. All of them, excepting three, acknowledge that they have no other degree, and that they paid \$12 for this one, received it by express, and were never in Wisconsin. In the case of Allbright, he went to Wisconsin ; while there, made a set of artificial teeth, performed one operation in the mouth, and then returned. There are four signatures to this diploma : A Professor of Anatomy ; a Professor of Operative Dentistry, George Morrison, D. D. S. ; President, George Morrison, in the same handwriting, but without the D. D. S., and a Secretary by the name of White.

W. C. Barrett : I am sorry this matter is not presented in the form of a resolution, but I move that the first recommendation of the committee be adopted. The idea of inquiry concerning the granting of *legitimate* degrees by this stench in the nostrils of any decent man, is a roaring absurdity, and a reflection upon the sapiency of the one who suggests it. It *cannot* confer a legitimate diploma, because it was founded and is conducted in fraud. The reception of its dirty, filthy "honors" is a disgrace to any man, for its so-called diplomas are certificates of villainy. They have been publicly on sale, and have probably been offered to every member of this Society. Such a college cannot grant a legitimate degree, for it never granted one in course. This Society cannot do better than to stamp upon everything emanating from that college its entire disapproval, and in the strongest and most effective terms possible. You cannot denounce this

sink of corruption too strongly. The Committee of Dental Law has followed this matter up with a great deal of perseverance. I had occasion to know a case where a man who had received one of these diplomas had gone from one place to another and another, and the whole city of New York was searched before finding him. We cannot denounce these diplomas in too strong language, and we can do nothing better than to help out the Committee in this matter.

C. D. Cook : I would like to ask if this college of Wisconsin has any show of authority for its existence ?

W. C. Barrett : It is organized under a special law of the State of Wisconsin, and as to its legality there can be no question. Wisconsin is responsible for it.

A. P. Burkhart : I would like to ask how long this college has been in existence ?

Wm. Carr : It was incorporated in 1880.

W. C. Barrett : It was organized for the especial purpose of peddling diplomas everywhere. They have agents in London and in Berlin for the purpose of selling these diplomas, and are publicly peddling them through Europe.

A Member : If that institution is legally constituted, and has a legal right to issue these things, have we the legal right to proscribe them ? I am in favor of putting it down, but can this Society do it ?

Wm. Carr : In this State the honorary degree is not recognized as a qualification for practice. A man must have a diploma from a reputable dental college recognized by this Society, obtained through an examination and graduation.

N. W. Kingsley : I think an answer to the gentleman is made in the first section of the Registration Act. Under the second and third section a committee was appointed to make a list of reputable dental and medical colleges, which should be recognized by this Society. That Committee made its report, and it was adopted, together with the list. It stands to-day unaltered, and it is to-day the only recognized list of dental and medical colleges this Society has ever made. This Wisconsin concern is not on the list, and perhaps some reputable colleges are not on the list. You can see how closely that committee drew the line—perhaps doing an injustice in ruling out some reputable institutions.

A Member : Would this cover the case of those who have registered since the close of the Registration books, or since they should have been closed, or does it refer only to those who hold diplomas from the Wisconsin Dental College ?

Wm. Carr : The law says they are illegally registered, and they are liable to prosecution.

O. E. Hill : I am not positive but that the suggestion of going before the Supreme Court is unnecessary. The Wisconsin Dental College is not recognized by this Society, and its graduates or diploma holders have no right to register. There is nothing calling for any action on our part except that the County Clerks be seen. These officials cannot of themselves interpret the law ; but with the help of the District Attorneys, can interpret it not only, but effectually enforce it.

J. G. Ambler : It strikes me that there is no objection to the passage of this resolution, because we can ask the Supreme Court to do this. That Court can do it or not, and the County Clerk will be compelled to recognize that Court's order.

The first recommendation was then adopted.

O. E. Hill : I would like to ask if that authorizes the Committee to expend any money, if they see fit.

Wm. Carr : The County Clerk cannot erase these names without an order from the Supreme Court. If we can prove that these men have never studied dentistry, but have obtained the degree by fraudulent means, I think that there will be no difficulty in having the names erased.

O. E. Hill : I was getting at the expense necessary to do this.

Wm. Carr : The expense, if any, will be very little ; I think it is the duty of the District Attorney to attend to it.

The second recommendation was adopted without discussion.

The third recommendation was discussed as follows :

Wm. Carr : If this had been done, the diplomas from the Wisconsin Dental College would never have been registered.

W. C. Barrett suggested that the Board of Censors be instructed to prepare this list, and that the Secretary be instructed to mail copies to the County Clerks of this State, as set forth in the recommendation.

C. D. Cook: I would suggest that to this list be appended the Dental Law. The Clerks of the several counties seem to know that we have a law, but do not seem to know what that law is.

A. P. Burkhart: If this resolution be adopted, and the Board of Censors prepare this list, this body will not know for some time to come what colleges have been accorded a place thereon.

N. W. Kingsley: I think it would be much better in this form: That the Board of Censors be instructed to prepare this list, and present it to this Society for adoption, and when adopted, to carry out the provisions of the resolution, to which should be added that a copy of the Registration Act accompany the list.

W. H. Atkinson: There is but one objection to that: Anybody may go to the County Clerk's office and register. You cannot cut off any reputable college.

N. W. Kingsley: It is in the power of this Society to name the colleges that it chooses to recognize as reputable. I wish to say that the committee that prepared the list of a few years ago, took the judgment as to medical colleges of gentlemen connected with the College of Physicians and Surgeons of New York.

W. H. Atkinson: The fault is in the organic law. It is too late to remedy it, but it is not too late for us to see and understand its pitfalls. We represent the combined wisdom of the State of New York in our profession, and we should be just in all that we do. From what Dr. Barrett has said, I learn that this Wisconsin concern has never given a diploma in course. That makes my conscience easy.

C. D. Cook: If a man having a diploma has the right to practice dentistry, no other man has the right to say he shall not, and proceed to bring him before the cross.

The third recommendation was then adopted.

The remaining recommendations were, upon motion, adopted without discussion.

W. C. Barrett moved that all practicing physicians and dentists present be granted the privileges of the floor, and be invited to take part in the discussions. The motion was carried unanimously.

The President: I will take this opportunity to state that the Committee of Prize Essays is incomplete, and I will therefore make the committee stand as follows: O. E. Hill, A. H. Brockway, S. D. French.

N. W. Kingsley: It seems to me surprising that this committee should at the last moment resign or decline to serve. I am opposed to any action that will excuse any member of that committee who is present.

The President: I confess that I have taken a roundabout way to accomplish this. Dr. Francis stated to me distinctly that he could not serve, and I accepted his resignation. It is now for you to decide.

W. C. Barrett moved that the resignation be laid upon the table.

The motion was carried.

In the place of W. A. Bronson, who was not present, the President appointed S. D. French.

The Degree of Master of Dental Surgery was then conferred upon the gentlemen named in the Report of the Board of Censors. In conferring the Degree the President addressed them as follows:

It gives me great pleasure to stand before you holding these parchment rolls, upon the inside of which, legible and distinct, may be found that evidence which speaks much in your behalf; which stands as a proclamation that you have undergone, at the hands of our Board of Censors, an examination which fully entitles you to rank as an M. D. S., and to be called worthy and well qualified—terms which must attach to all who successfully pass the trying ordeal. No better proof could be found of your wish to excel, of your ambition to aim for a high standing in your profession, than the fact that you have offered yourselves as candidates for the highest honors which can be conferred by any Board of Examiners anywhere.

You stand before us to-day justly entitled to our regard, having placed yourselves upon a record that should bring many fruits to yourselves and to the profession you have adopted. May you show, by precept and example, that the respectability and dignity of our profession is based upon culture, talent, zeal, and integrity. In your examination you have proven that you base the superstructure of successful practice upon knowledge of anatomy, physiology, pathology and chemistry, which will enable you to walk through and over fields of labor understandingly and as one practising a specialty of medicine.

In the daily contact with vital structures, it becomes the dentist to understand and appreciate the relations each part bears to every other part of the human system, and that through a thorough knowledge of the principles of general medicine alone can he expect true success. May I urge that upon your return to your respective homes, you do all in your power to spread abroad the fact that ours is not a mere mechanical business or trade, but a profession, second to none in its

power to relieve the sufferings and repair the damages created by a mistaken civilization.

Seek not so much to earn the "dollar," as to prove yourselves competent to treat intelligently all who come to you confiding in your skill; show to them that their confidence has not been misplaced, and they will come again and send others, and in the end your every success will be made sure.

I present you each with this diploma, granted you by the Dental Society of the State of New York, upon the recommendation of our Board of Censors, and I trust it will stimulate and encourage all whom you may meet who are desirous of engaging in the practice of dentistry. And now may that Constellation that has guided you to this hall ever guard and protect you, and may you follow it in its glittering pathway to a brighter and clearer effulgence, as the months pass by and the years roll on. Amen.

A. M. Holmes: I wish to make a brief statement here of some interest and importance to this Society. I this morning happened to learn that there was some legislation in progress before the present Legislature that had some bearing on the laws of our Society. I went to the Senate and there learned that a bill* had been introduced and passed, which provided that persons other than residents of the State of New York, living in the United States, and coming into this State to reside after our law went into effect, should be allowed to register within sixty days after the passage of the bill. The bill had been sent

* Following is a copy of the bill:

SENATE BILL, NO. 360.

AN ACT for the relief of certain persons engaged in the regular practice of dentistry.

The People of the State of New York, represented in Senate and Assembly, do enact as follows:

SECTION 1. Any person who was engaged in the regular practice of dentistry within any State of the United States except this State, on the twentieth day of June, eighteen hundred and seventy-nine, and who would have been entitled to registration as a dentist, as provided in the third section of chapter five hundred and forty of the laws of eighteen hundred and seventy-nine, entitled "An act to regulate the practice of dentistry in the State of New York," had he been so practicing within this State, and who shall make and file with the clerk of the county in which he registers his affidavit to the effect that he was so engaged in such practice of dentistry, may, within sixty days after the passage of this act, cause his name, office and post-office address to be registered in the county clerk's office in the manner provided in said third section of said act, and such registration shall have like force and effect as if made within the time prescribed by said section of said act, according to its provisions. Any person who shall willfully make and file a false affidavit for the purpose of procuring such registration shall be subject to conviction and punishment for perjury.

SEC. 2. This act shall take effect immediately.—*Com. of Pub.*

to the Assembly, and ordered to a third reading. While I was there it was referred back to the Committee on Public Health. I propose that a committee shall be appointed (that in case there is a hearing this evening on the bill which the chairman of the committee informed me should be given if possible), to represent this Society in opposition to that bill. We might just as well strike out our law and go home if this bill shall pass. It lets in a whole flock of irresponsible practitioners to degrade our profession and impose on the public.

After a somewhat desultory discussion as to the form of a resolution, or letter, expressive of the feeling of the Society in regard to the matter in question, it was moved by Wm. Jarvie, Jr., that a committee be appointed to prepare a suitable letter or resolution to the Committee on Public Health, said committee to report such letter or resolution at the afternoon session.

A. M. Holmes: I am in favor of this resolution. I think it should embody the fact that this Society has opened a Register to everybody deemed qualified to practice, and that we do not deny this right to any reputable dentist.

A. P. Burkhart: If members of this Society would make it a point to see legislators from their respective districts during the noon recess, they could inform them as to the law as it now stands, and the mischief that this new legislation would work.

A. M. Holmes: All that is necessary is to have a committee go before the Committee on Public Health, and oppose the passage of this bill.

The motion was carried, and the President appointed as such committee A. M. Holmes, N. W. Kingsley, and O. E. Hill.

A. M. Holmes: I think there has been a little inadvertence shown in the appointing of this committee; I therefore move that Dr. Jarvie be added to the committee.

Carried unanimously.

The Committee of By-Laws reported the following:

The Committee of By-Laws respectfully reports that it has carefully read and examined the report of the Committee on Codification of Dental Laws, and hereby recommends it to the Society for adoption.

J. J. PITTS,
JAS. H. HOLLY,
CHAS. K. VAN VLECK,
Committee

N. W. Kingsley, Chairman of the Committee on Codification of Dental Laws, read the report, adding the following :

You may not all be aware of the object for which this Committee was appointed. It had become evident that all our members did not understand fully the laws, by-laws and resolutions, and possibly the organic law under which we were working. There was misconstruction and certainly misconception. A committee was therefore appointed to reconcile and codify these laws. That committee has spent many weeks upon the subject, has had many sessions, and has found that in some respect it was a difficult matter to harmonize things it wanted to.

We have first the State law, passed in 1868; secondly, two or three amendments [amendments read]; and finally, the amendment which we call the "Registration Act," and which provides as follows [reads the Act], and concluding with the clause, "that all Acts or parts of Acts conflicting with this Act are hereby repealed."

In addition to these Legislative Acts there are by-laws and resolutions—standing resolutions of this Society, of questionable authority; that is to say, it is questionable if the State Society had a right to make and pass those resolutions. I assure you that the committee has performed its labors to the best of its ability up to this time, and the report is unanimously signed.

[The report is not inserted in this year's Transactions, as it was subsequently ordered to be printed in the form of a circular and distributed among members for examination during the year, to be called up at the next annual meeting for adoption.—*Com. of Pub.*

The State Board of Censors has felt it important that it should have some knowledge of the standing of the candidate in the community where he resides, and it has desired that evidence of such standing should be brought to it from the district board of censors. The Committee has endeavored to embody such requirements in this code, by stating the qualifications necessary—just the same as in the certificate now required by the Board of Censors.

O. E. Hill: In the sections you have just read you say nothing about attainments.

N. W. Kingsley: Under the laws of the State, the State Board of Censors is required to examine into and report upon the professional attainments of any applicant; it would seem unnecessary and inconsistent to require the district boards to make like examinations. The State Board must enquire into his professional attainments, including his practical ability, and before recommending him for a degree, they desire to pass upon his standing in the community and his fitness to adorn the profession; the evidence under this part of their examination they desire shall be furnished by the district board of censors.

A. P. Burkhart: When you speak of certificates from district boards of censors, you mean that the candidate for examination by the State Board shall possess the certificate as described. Now for him to become a member of a district society, he has to submit there to an examination as to his qualifications. Do you mean to be understood that the examination as to these qualifications are to be done away with?

N. W. Kingsley: We cannot legislate for any district society. We have no right to say they shall examine the applicant before taking him, for it has the power to do as it sees fit; we can only tell them they cannot do anything inconsistent with us.

W. C. Barrett: It is the old question of State sovereignty.

N. W. Kingsley: Yes; and we prefer to be on the safe side, and accord them "State rights." I think we can exercise some authority over the district boards, as boards, but not as district societies.

A Member: I notice you keep the amount of the dues just the same. The society has the sum of \$1,600 dollars in the treasury now.

N. W. Kingsley: We can use that for the benefit of dentistry.

The report was upon motion received.

It was then moved by Wm. Jarvie, Jr., that it be referred back to the Committee for publication, copies to be furnished to members of the Society.

O. E. Hill: I think that it is just as near perfect as it can be made. It is simply our law. I must congratulate the Committee upon confining itself so strictly to our laws, with the exception of requiring dues from the district societies. There has been a good deal of conflict about the by-laws. The Committee has changed them very little, and they seem to be as nearly perfect as possible. I do not think any further change could be for the better. Aside from the name of the district societies and the dues, there is but little change.

W. H. Atkinson: As I understand it, you can only collect dues where district societies have delegates present.

O. E. Hill: Whether present or not.

N. W. Kingsley: If not present, they lose their standing.

O. E. Hill: He is a member for four years.

N. W. Kingsley : He is not a member till he qualifies.

O. E. Hill : This Society cannot exclude a delegate member without some reason. He is a delegate from a district society, and this Society has nothing to do with that delegate.

N. W. Kingsley : If he does not comply with our rules, he cannot come here.

W. C. Barrett : I think the by-laws, as reported, very complete. But this is not the way to go to work. No snap action, without due consideration by each member, should be taken. I do not think, therefore, that a codification of the laws of this Society for all time, should be adopted only upon the report of the Committee. It should be considered by every member of the Society. The sure way is to read the report, and then adopt it section by section. The only object I can see for rushing it through in this way is the saving of time. It should be adopted in such shape that we may learn what amendments have been added to it year by year. I think it should be considered section by section.

J. G. Ambler : I endorse the remarks of Dr. Barrett. As it was read there were some things I did not like ; but I did not oppose it then, because I thought it would be taken up section by section. For the satisfaction of all, I think we had better adopt the motion of Dr. Jarvie, and have it printed and circulated among the members that they may see and read it, and when we get together again this year or next, we shall know all about it, and just what action to take.

O. E. Hill : I have no objection to its being considered section by section ; but I object to having it printed, because it is very nearly the law we have been working under year by year. If taken up in the way proposed, I do not think it would be changed ten words.

Wm. Jarvie, Jr. : I do not like to take up your time ; but I think if it were taken section by section, it would require a great deal of time. If printed, and a copy furnished to each member, it would be more satisfactory. We have waited a long time for this, and we can just as well wait another year. I think this Committee has labored with a great deal of judgment in the preparing of this code ; but for all that I see some things I should object to, and which the Committee has decided the other way. For instance, the second section changes the name of every district society [reads the section]. It was decided

some years ago that the name should be, for example, First District Dental Society." The judicial districts may change, and then, if we adopt section second, we should have to change the names of all of our district societies.

N. W. Kingsley: There was no intention of changing the name; and if the change of name is really a change that is important, I would say it was not intended.

W. C. Barrett: Dr. Jarvie's motion was virtually to have the motion laid upon the table for one year, and that the report be published.

Wm. Jarvie, Jr.: The motion was this: that this be referred to the Committee for publication, and that a copy of it be sent to each member of the Society.

N. W. Kingsley: If this is going to the printer, I would like to move as an amendment that the name of both the State Society and of the district societies be established, and made to correspond to the proper names; that the Committee have the privilege of making that change.

The motion as amended by Dr. Kingsley, was carried.

The Committee on Diagram of Incisor Tooth reported progress.

The Committee of Business reported the following order of business for the afternoon session:

At 3:30—Call to order, read minutes of morning session, and relate and discuss Incidents of Office Practice.

At 4:00—Essay by W. H. Atkinson, of New York, on The Preparation of the Mouth for Artificial Teeth.

At 5:00—Essay by Frank Abbott, of New York, A Condensed History of Histological Observations. Discussion till adjournment at 6 o'clock.

M. E. ELMENDORF,
Committee.

The Secretary read the Annual Reports of the several District Societies, as follows:

FIRST DISTRICT.

The last annual meeting of the First District Dental Society, S. N. Y., was held April 1884, in the city of New York. Nearly forty active members were present, besides visitors. The election of officers resulted as follows:

President, A. L. Northrop, 44 West 46th Street; Vice-President, Wm. Carr, West 46th Street; Secretary, James E. Dexter, 8 East 34th Street; Treasurer,

Charles Miller, 331 Madison Ave. ; Librarian, J. F. P. Hedson, 19 West 39th St. ; Board of Censors (elected last year—1883—for five years) ; Executive Committee, J. F. P. Hedson, C. A. Woodward, B. C. Nash ; Clinic Committee, C. F. W. Bödecker, W. H. Atkinson, Wm. Carr.

Delegates to the New York State Dental Society, Charles F. Ives and W. W. Walker.

The Society numbers, at the present writing, 93 active members. It has held eight regular meetings and clinics during the year, at which various papers, discussions, clinical lectures and operations, and exhibitions of appliances, have been had. The society continues the publication of its transactions in the *Dental Cosmos*.

The Secretary can truly repeat the closing sentence of last year's report of this Society,—that its "financial condition is excellent, and its general condition as a working Society not to be surpassed by any similar organization."

JAS. E. DEXTER,

Secretary.

SECOND DISTRICT.

The annual meeting of the Second District Dental Society was held in the city of Brooklyn, Tuesday, March 11th, 1884, at the office of A. H. Brockway. The election of officers for the ensuing year was as follows :

President, J. H. Holly, Warwick ; Vice-President, E. Parmly Brown, Flushing ; Recording Secretary, A. N. Roussel, Brooklyn ; Corresponding Secretary, F. J. Van Woert, Brooklyn ; Treasurer, L. G. Wilder, Brooklyn ; Librarian, F. W. Dolbeare, Brooklyn ; Censors, Wm. Jarvie, Jr., A. H. Brockway, O. E. Hill, H. G. Mirick, C. F. Allen.

Delegates to the State Society : E. H. Dickey in place of E. H. Dickey ; James J. Mills in place of C. W. Harveys.

There were present at this meeting 31 members. We have now a membership of 68, with an increase for the past year of 20 new members, 12 of whom joined the Society through an agreement made with the Brooklyn Dental Society. As the following report of the Conference Committee fully explains how this was done, I give it in full :

October 9th, 1883.

TO THE SECOND DISTRICT DENTAL SOCIETY :

At a conference held October 4th, between a committee appointed by the Brooklyn Dental Society, and a committee appointed by this Society in June, to take into consideration the lessening of the number of meetings of the two societies, it was resolved : That this conference recommend to the Brooklyn Dental Society and the Second District Dental Society that two meetings of each society be held each year, the dates to be so arranged that a meeting of one or the other Society be held every three months, and that Brooklyn members of the Second District Dental Society, who are not already members of the Brooklyn Dental Society, may be made so without any initiation fee, and that all active members of the Brooklyn Dental Society, who are not already members of the Second District Dental Society, be made so without any initiation fee.

WM. JARVIE, JR., *Chairman of Committee.*

This is unquestionably a great achievement. By this arrangement the two societies have eight meetings a year, and arranged in such manner in regard to dates as not to conflict with one another, or occur too often; and the *entente cordiale* which should exist between these two societies is undoubtedly established by the adoption of this plan.

Our Society never was in a healthier or more flourishing condition; our meetings are interesting and crisp; all new theories, methods and appliances are discussed and tested, and a disposition manifested to get out of ruts, and be *eclectic*, all of which signifies progress. Financially we are solid, our treasurer's report showing a balance in hand of \$373.57. All of which I have the honor to submit.

A. N. ROUSSEL,
Recording Secretary.

THIRD DISTRICT.

The Secretary of the Third District Dental Society begs leave to submit the following report :

We, as a Society, are in a very flourishing condition—to die. We have once since the last meeting of the State Society succeeded in getting together a sufficient number of members to form a quorum—seven.

Seven stately nags
All fought with sticks;
One went away.
Then there were six.

Not a quorum left. We could finish no business—had no power to adjourn—so, like the Arabs, “we folded our tents and silently stole away,” leaving the meeting open under the order of “unfinished business.”

A. M. WRIGHT,
Secretary.

FOURTH DISTRICT.

Our annual meeting was held August 7th. 1883, a session of one day. There were present about ten members, with an addition of one new member. An interesting meeting was held in spite of a small attendance. A new set of by-laws and a code of ethics were adopted. The following were the officers elected for the ensuing year :

President, W. H. Colgrove, Johnstown; Vice-President, G. E. Lamb, Port Henry; Secretary, A. C. Rich, Saratoga Springs; Treasurer, J. P. Niles, Ballston Spa; Corresponding Secretary, Wm. E. Lansing, Gloversville; Librarian, J. H. Collins, Granville; Censor, W. H. Colgrove, Johnstown.

State Delegates, A. C. Rich and A. T. Hawley. The Society adjourned to meet in Saratoga Springs in August, 1884.

A. C. RICH,
Secretary.

FIFTH DISTRICT.

The Fifth District Dental Society of the State of New York held its sixteenth annual meeting at Utica, April 8 and 9, 1884, President Relyea in the chair. Officers for the present year are :

President, C. E. Cherry, Syracuse ; Vice-President, C. C. Smith, Ilion, N. Y. ; Recording Secretary, G. L. Curtis, Syracuse ; Correspondent, B. T. Mason, Phoenix ; Treasurer, J. C. House, Lowville ; Librarian, A. M. Priest, Utica ; Censors : S. B. Palmer, Syracuse ; Chas. Barnes, Syracuse ; H. M. Tompkins, Clayville.

Delegates to State Dental Society : G. V. N. Relyea, Oswego, 4 years ; F. G. Tibbetts, Fayetteville, 4 years.

An invitation was received to hold the semi-annual meeting in conjunction with the Sixth District Society, at Syracuse, on 2d Tuesday in October. The Society now numbers forty members, three having been added to the list during the year. The general condition of the Society is excellent, and the interest manifested far above the usual standard.

G. L. CURTIS,
Secretary.

SIXTH DISTRICT.

I have the honor to submit the following report :

The Sixth District Dental Society held its fifteenth annual meeting at Binghamton, on Tuesday, May 6th, 1884. The Society has now on its roll 36 active members ; 16 were present at this meeting.

The following officers were elected :

President, M. D. Jewell, Richfield Springs ; Vice-President, C. E. Dunton, Cazenovia ; Recording and Corresponding Secretary, E. D. Downs, Owego ; Treasurer, Frank B. Darby, Elmira ; Censor, A. M. Holmes, Morrisville.

Delegates to State Society for four years : M. D. Jewell, Richfield Springs ; E. D. Downs, Owego.

Delegates to American Dental Association : F. B. Darby, Elmira ; W. C. Stewart, Elmira ; L. E. Ireland, Oneonta ; E. D. Downs, Owego ; A. M. Holmes, Morrisville ; C. E. Dunton, Cazenovia ; R. Walker, Owego.

Committee on Ethics : M. D. Jewell, Richfield Springs ; F. B. Darby, Elmira ; A. M. Holmes, Morrisville.

Respectfully submitted.

E. D. DOWNS,
Secretary.

SEVENTH DISTRICT.

Since the last annual report this Society has held two meetings.

The semi-annual meeting was held in Buffalo, October 30th and 31st, 1883, with the Eighth District Dental Society, it being the custom with the Seventh and Eighth District Societies to hold their semi-annual meetings together, alternately in Buffalo and Rochester. This arrangement is found to give additional interest to the work. The meeting is presided over by the officers of the district in which it is held.

The sixteenth annual meeting was held in Rochester on the 29th and 30th of

April, 1884. 23 members were present. The following resolution, introduced by F. E. Howard, of Geneseo, was adopted by the Society :

"Whereas, members of the dental profession have at times experienced the inconvenience of serving on juries, and the public has greatly suffered thereby, and believing that the channels for the relief of human suffering should be freely opened up from all directions, therefore, be it

Resolved, that, in the opinion of this Society, members of the dental profession should be exempted from serving upon juries, and that the Seventh District Dental Society here and now protest against the further enforcement of the law that exacts jury duty from one following dentistry as a profession.

Resolved, that the attention of the State Society be and is hereby called to this matter, and that it be requested to take such action as shall afford the relief desired, and that the Recording Secretary incorporate these resolutions in his next annual report to the State Society."

One has been admitted to membership. The resignations of two members have been received and accepted. At present the society numbers forty-four members. The officers for the ensuing year are as follows :

President, J. S. Walter, Rochester ; Vice-President, M. H. Smith, Penn Yan ; Recording Secretary, C. T. Howard, Rochester ; Corresponding Secretary, P. L. Stoddard, Prattsburg ; Treasurer, J. Requa, Rochester ; Librarian, F. D. Brown, Mount Morris. Censors : J. Edw. Line, Rochester ; G. W. Tripp, Auburn ; H. C. Knickerbocker, Seneca Falls ; B. G. Saunders, Rochester.

Delegates to State Society : H. C. Knickerbocker, Seneca Falls ('85) ; P. L. Stoddard, Prattsburg ('85) ; C. F. Booth, Canandaigua ('86) ; M. H. Smith, Penn Yan ('86) ; F. D. Brown, Mount Morris ('87) ; A. P. Burkhart, Dansville ('87) ; J. S. Walter, Rochester ('88) ; B. G. Saunders, Rochester ('88).

CHAS. T. HOWARD,

Recording Secretary.

EIGHTH DISTRICT.

Herewith I submit the sixteenth annual report of the Eighth District Dental Society, as follows :

1. The annual meeting of this Society is now held on the third Tuesday in April, and the semi-annual is appointed for the last Tuesday in October.

2. But one meeting has been held during the past year, that being the annual meeting, which convened in the city of Buffalo, on Tuesday, April 15th of the present year, at which 22 members were present, together with nine visitors. Three original papers were read and discussed, and the occasion was one of average interest, the customary harmony and fraternal good-will prevailing.

3. The following is the list of officers elected to serve during the ensuing year

President, W. A. Barrows ; Vice-President, W. C. Gardiner ; Recording Secretary, S. A. Freeman ; Corresponding Secretary, B. Rathbun ; Treasurer, C. W. Stainton ; Librarian, M. B. Straight ; Censor for 4 years, B. Rathbun, Dunkirk.

Delegates to Dental Society of State of New York, 4 years: C. W. Stainton (re-elected) Buffalo; C. J. Ellis (in place of J. C. Gifford, term expired), Cattaraugus

4. The active membership of the Society includes the names of 39 practitioners of dentistry, two members having been expelled in conformity to our By-Laws since the last report. The following are the members in good standing at the present date:

A. J. Allen, Lockport; C. A. Allen, Buffalo; H. B. Arnold, Jamestown; E. M. Baker, Medina; L. Baleom, Lockport; W. C. Barrett, Buffalo; W. A. Barrows, Buffalo; L. W. Bristol, Lockport; C. S. Butler, Buffalo; M. F. Cook, Buffalo; G. C. Daboll, Buffalo; M. H. Dailey, Akron; E. H. Danforth, Jamestown; H. B. Doolittle, Albion; G. W. Dunbar, Buffalo; C. J. Ellis, Cattaraugus; T. A. C. Everett, Randolph; S. A. Freeman, Buffalo; W. C. Gardiner, Batavia; J. B. Gates, Niagara Falls; J. C. Gifford, Westfield; J. Granger, Mayville; L. F. Harvey, Buffalo; C. Houghton, Batavia; D. S. Joyce, Buffalo; L. R. Leach, Hamburg; M. F. Lenox, Jamestown; A. C. Lewis, Buffalo; T. S. Phillips, Buffalo; B. Rathbun, Dunkirk; J. B. Rawson, Jamestown; G. B. Scott, Buffalo; G. B. Snow, Buffalo; A. P. Southwick, Buffalo; L. C. Squires, Willink; C. W. Stainton, Buffalo; M. B. Straight, Buffalo; C. Watts, Lockport; N. Whitecomb, Buffalo.

5. The only dental organization besides the Eighth District Dental Society, having a home or existence within the boundaries of this District, is the Buffalo Dental Association, now the oldest Dental Society in the State.

6. The Society may truly be said to be in a prosperous condition. The treasury has a balance of \$200 on hand; the library contains about 250 bound volumes; the meetings are well sustained; the officers and committees manifest a commendable interest in its affairs, and all that is needed is the addition of every well-qualified practitioner in the district to the roll of membership to complete its prosperity.

Respectfully submitted.

S. A. FREEMAN,

Recording Secretary.

The reports were received and placed on file.

The Committee of Publication submitted the following Supplementary report:

In adding the Appendix to the Transactions of '82-3, the Committee of Publication based its action on the following from the minutes of annual meeting of '80 (Records, pp. 289-90): "Your committee (Special Committee on Dental Law, Holmes, Straw and Freeman) would further report that a certified copy of the registration of the whole State has been procured, which we herewith present to the Society, and *recommend* its reference to the Committee on Publication." Also,

"On motion, the report was accepted, and the recommendations adopted."

The determination to publish was seconded by the President, and the result of the Committee's work is with you.

We now offer the following :

Resolved, That the above recommendation to publish the registry of this State be and hereby is, so far as the Transactions of '79, '80 and '81 are concerned, rescinded.

J. EDW. LINE,
FRANK FRENCH,
CHAS. BARNES,
Committee.

The report was received and the resolution adopted.

Adjourned till afternoon.

FIRST DAY—AFTERNOON SESSION.

GEOLOGICAL HALL, ALBANY, }
May 14, 1884. }

The Society was called to order by the President.

The reading of the minutes of the morning session was dispensed with, the Stenographer not having prepared an abstract of his notes.

Incidents of Office Practice were related by Charles Barnes.

J. G. Ambler: In the absence of other business for consideration by the Society at this time, I will call attention to one of the features of the President's address,* and express my extreme satisfaction that the matter has been alluded to in the manner it has. It may be within the recollection of some of the members here that several years ago I made the proposition, and moved its adoption, for us to take the initiative in the formation of a National Association, and to send word to other State organizations that we were ready to meet delegates from them, and form a National Association upon a basis of representation, as do the churches—for instance, the Episcopal church, which has its diocesan conventions, and its general convention. The diocesan convention receives delegates from the different societies in the diocese, and the general convention is made up of delegates from these diocesan conventions. My proposition had the go-by at that time ; but since

* See page 50.

the subject has been brought up in this circular, I will take the liberty of calling the attention of the Society to this feature, and heartily commend it. I think that a proper consideration of the matter by us would bring about harmonious action between the different State societies, and in order to bring it properly before us, I move that a committee having this object in view be appointed by the Chair, to report, if convenient, before final adjournment, or, if deemed advisable, at a future meeting.

After some unimportant discussion it was moved by M. L. Rhine that the matter lay on the table until the consideration of miscellaneous business.

The motion was carried.

A paper by W. H. Atkinson, *The Preparation of the Mouth for Artificial Teeth*, was read by its author, and discussed by C. S. Stockton and M. L. Rhine.

A. M. Holmes: I would ask unanimous consent to have the committee appointed at the morning session to prepare a resolution or letter to the Committee on Public Health, make its report. The request was granted, and the committee, through Dr. Jarvie, reported as follows :

Wm. Jarvie, Jr.: Your committee has prepared the following letter to the Committee on Public Health, to be signed by the President and Secretary, and sealed with the seal of the Society :

THE DENTAL SOCIETY OF THE STATE OF NEW YORK,
IN SESSION AT ALBANY, MAY 14, 1884.

To the Committee on Public Health, of the Assembly of the State of New York.

GENTLEMEN:—It has come to the notice of this Society, that a bill known as Senate bill No. 360, for the relief of certain persons engaged in the practice of dentistry, is before your body for consideration.

The laws already enacted, regulating the practice of dentistry in the State, fully protect the interests of the people, and are for the good of the public health. We deprecate any interference with them, and most respectfully protest against any enactment which shall allow irresponsible parties to come into this State and practice dentistry. Provision is made in the laws already enacted to allow persons, properly qualified and residing in other states, to come into this State and practice.

This Society appointed A. M. Holmes, O. E. Hill, N. W. Kingsley, and Wm. Jarvie, Jr., a committee to present this communication to your honorable body, and give such further information as you may desire. [Signed]

L. S. STRAW, *President.*

J. EDW. LINE, *Secretary.*

The report was adopted.

Frank Abbott, of New York, presented a paper entitled *A Condensed History of Histological Observations*. It was discussed by W. C. Barrett and W. H. Atkinson.

The Committee of Business reported the following :

Your Committee would report the following order of business for the evening session :

At 8:00—Call to order and read minutes of previous meeting.

At 8:15—Incidents of Office Practice.

At 8:40—Essay by J. Edw. Line, of Rochester, *On the Transposition of Certain Functions of the Teeth*, with discussion.

At 9:15—Essay by E. Parmly Brown, Flushing, *on Dental Students*, with discussion.

At 9:45—Miscellaneous and unfinished business, and report of the Committee of Business. Adjournment until 9 a. m. to-morrow.

M. E. ELMENDORF,
FRANK B. DARBY,
Committee.

FIRST DAY—EVENING SESSION.

GEOLOGICAL HALL, ALBANY,)
May 14. 1884.)

The minutes of the afternoon session were read by the Stenographer, and on motion were approved.

Incidents of Office Practice were related and discussed by A. H. Brockway, S. B. Palmer, W. C. Barrett, "A Member," N. W. Kingsley, E. L. Swartwout and Frank Abbott.

J. Edw. Line, of Rochester, read a paper *On the Transposition of Certain Functions of the Teeth*.

E. Parmly Brown, of Flushing, next read a paper *on Dental Students*. He prefaced the reading of the paper by the following : I cannot read the paper announced in the programme, but have one here which I think timely, and on quite as interesting a subject.

At the conclusion of the reading the paper, Dr. Brown offered the following :

Resolved, That this Society appoint a committee of three, with power to draft a form of contract, to be approved by a competent legal advisor, and submitted to this Society at its next meeting for approval, which contract shall be binding in the courts of this State, by the signing before witnesses of said printed agreement, to prevent dental students from improperly interfering with the practice of their preceptors, copies of the same to be obtained of the Secretary of this Society, for the sum of one dollar each, which will reimburse the Society for expense of legal advice, printing, etc., said expense not to exceed the sum of thirty dollars.

W. C. Barrett : This forenoon a resolution was passed extending to visiting dentists the privileges of the floor. We have with us this evening a dentist whom we all greatly respect, and I wish to call the attention of Dr. C. T. Stockwell, of Springfield, to the fact that he is entitled to all the privileges of the floor.

C. T. Stockwell : My friend, Dr. Barrett, suggests that that calls for a speech ; but he knows very well that I cannot make a speech. I wish, however, to extend my thanks, and say further that if, in the course of the discussion, I find that I can offer anything to your advantage, I shall be most happy to do it.

A. P. Burkhart : To bring the resolution of Dr. Brown before the Society, I will second it.

Wm. Carr : I move that it be laid upon the table. Carried.

N. W. Kingsley called for a division of the house.

O. E. Hill : I would like to explain my vote. I vote against this resolution as I do always on a motion to lay upon the table before a word is spoken about it.

A division of the house being had, the motion to lay upon the table was declared lost.

W. C. Barrett moved its reference to a committee of three, to report at a time to be designated by the Committee of Business. Carried.

The chair appointed as such committee, W. C. Barrett, O. E. Hill, Wm. Jarvie, Jr.

The following occurred under the head of Miscellaneous Business :

J. G. Ambler called from the table the resolution offered by him respecting the formation of a National Association : I this morning stated that it was a matter I had thought considerably of, and had broached to this Society some years ago. I think that we should take the initiative in this matter, and that that portion of the President's address which refers to the formation of a National Association should

be referred to a committee. I therefore move that the resolution offered this morning in regard to the formation of a National Association be taken from the table. Carried.

O. E. Hill: Dr. Abbott's name is signed to that paper; I would ask if he can give us some information.

Frank Abbott: I know but very little about it, excepting that for some time there has been a feeling on the part of a great many men, south and north, that such an organization would meet their approval.

J. G. Ambler: I now move that the subject be referred to a committee of three, to report at the next annual meeting.

The motion was carried, and the chair appointed as such committee J. G. Ambler, Frank Abbott, and S. B. Palmer.

It was asked by the second appointee that he be excused from serving upon this committee.

O. E. Hill: Is there anything before the house?

Frank Abbott: Yes, sir; I am before the house, and I want you to know that I am something, and that I'll not sit down till I get ready.

O. E. Hill moved that Dr. Abbott be excused from acting upon the committee. The motion was declared lost.

Upon a call for a division of the house by Dr. Abbott, the motion to excuse him was declared carried, and he was therefore excused.

The President appointed O. E. Hill in the place of Frank Abbott.

O. E. Hill: I move that Dr. Hill be excused from serving upon that committee. The motion was declared lost.

A Member: Does Dr. Hill desire a division of the house?

The Committee of By-Laws reported (not among papers in hands of Committee of Publication):

The report was adopted.

The same committee also reported the following bills as correct, and on motion they were ordered paid (not among papers, etc.):

The Secretary read a letter from the Secretary of the National Dental Association of the United States of America, stating that the Society would meet in Washington, D. C., Tuesday, July 22, '84. Received and placed on file.

He also read a communication from the Secretary of the Seventh District Dental Society in regard to the exemption of dentists from jury duty. The letter called special attention to the resolutions embodied in the report of the Society in question (see page 75).

On motion, the communication and resolutions were referred to the Committee of Dental Law.

The Committee appointed by the Society to appear before the Committee on Public Health, reported that it had nothing at present to say as to what had been done "officially," but would state that they had been given to understand that those most concerned were "out of the woods."

The Committee of Business reported the order of business for the morning session of May 15th.

Adjourned till Thursday, May 15th, at nine o'clock.

SECOND DAY—MORNING SESSION.

GEOLOGICAL HALL, ALBANY, }
May 15, 1884. }

The meeting was called to order by the President, and the minutes of the previous session were read by the stenographer and approved as read.

The Committee (Board of Censors) appointed to revise the list of Dental and Medical colleges which should be approved by the Society as "reputable" made its report. In making the report the Chairman (Dr. Kingsley) spoke as follows :

Several years since the committee that had this matter then in charge, took the advice of two or three of the prominent medical colleges, as to what medical colleges should be put upon our list, and that committee reported to this Society and the report was adopted. Your present committee last evening re-adopted the same list with but one addition, that is, the Castleton Medical College, which for some reason the original committee had overlooked. In making the list of dental colleges, all those chartered by the Legislature of this State must of course be on, and thus we find the New York College of Dentistry, and also the New York College of Dental Surgery, formerly located at Syracuse. There are other dental colleges besides those on the list,

which might possibly be entitled to recognition, but your committee had no specific knowledge in relation to them, and thought it better to leave them off until it knows more of them. If this list of colleges is approved, the committee have a resolution to offer, which had better come after the disposition of this list.

Following is the list :

The Board of Censors reports the following Dental and Medical Colleges as reputable, and as such their diplomas are entitled to recognition by this Society :

DENTAL.

Baltimore College of Dental Surgery.
Ohio College of Dental Surgery.
Pennsylvania College of Dental Surgery.
Philadelphia Dental College.
Missouri Dental College.
Dental Department of University of Maryland.
Dental Department of University of Michigan.
Dental Department of University of Pennsylvania.
New York College of Dentistry.
Dental Department of Harvard University.
New York College of Dental Surgery.

MEDICAL.

Medical College of Alabama.....	Alabama.
Medical College of the Pacific	California.
Medical Department of Yale College.....	Connecticut.
National Medical College.....	District of Columbia.
Atlanta Medical College	Georgia.
Savannah Medical College	"
Rush Medical College.....	Illinois.
Chicago Medical College.....	"
Medical College of Indiana.....	Indiana.
Evansville Medical College	"
Medical Department of Iowa State University	Iowa.
Medical Department of University of Louisville.....	Kentucky.
Louisville Medical College.....	"
Kentucky School of Medicine	"
Medical Department of University of Louisiana	Louisiana.
Medical School of Maine	Maine.
Medical Department of Harvard University.....	Massachusetts.
Medical Department of University of Washington.....	Michigan.
Detroit Medical College	"
Medical Department of University of Michigan.....	"
Kansas City College of Physicians and Surgeons	Missouri.
Missouri Medical College	"
St. Joseph's Hospital Medical College	"
Medical Department of Dartmouth College.....	New Hampshire.

Medical Department of University of City of New York.....	New York.
Bellevue Hospital Medical College	"
Long Island Hospital Medical College	"
Albany Medical College	"
Medical Department of University of Buffalo	"
Medical Department of Syracuse University	"
Medical College of Ohio	Ohio.
Cleveland Medical College.....	"
Cincinnati College of Medicine and Surgery	"
Miami Medical College.....	"
Sterling Medical College	"
Medical Department of University of Wooster	"
Columbus Medical College	"
Medical Department of University of Pennsylvania.....	Pennsylvania.
Jefferson Medical College.....	"
Medical College of South Carolina	South Carolina.
Medical Department of University of Nashville	Tennessee.
Nashville Medical College	"
Texas Medical College and Hospital	Texas.
Castleton Medical College.....	Vermont.
Medical Department of University of Vermont	"
Medical Department of University of Virginia	Virginia.

FRANK FRENCH,
Secretary.

The report was upon motion of Dr. Barrett received.

It was moved that if the committee hold over, it may add to that list such colleges as may be deemed worthy.

N. W. Kingsley: I object to any committee having that power. It is the State Society that should recognize the colleges, and not a committee.

A Member: I would ask why the Boston Dental College was left off?

N. W. Kingsley: I do not know anything against it of my own knowledge, but reports prejudicial to it have been current.

W. C. Barrett: I am in favor of placing upon the list of colleges recognized by our Society, all respectable colleges—every college that has a fair semblance of respectability; because if they are placed upon that list we can bring them to time. If they illegally graduate a student, it is in the power of this Society to call them before it and try them; to exonerate them if not found guilty. Therefore I am in favor of placing upon this list every college of the character named.

N. W. Kingsley: With the spirit of Dr. Barrett's remarks I heartily agree, but I do not approve of his methods. If a college has been recognized by us and placed upon our list, and that list is certified to by the President and Secretary over the seal of the Society, and given to the County Clerks throughout the State, it will become their authority in registering an applicant and permitting him to practice. If a man has been graduated from one of these institutions, no matter how irregularly, and he comes the next day to the County Clerk and is registered, how are you to get his name off? Because the various County Clerks have not been furnished with an authorized list, we find men have been registered who held the diploma of the Wisconsin Dental College, and we shall have to apply to the Supreme Court and get a mandamus to have the names removed. It seems to me that if a student of a college not on this list, comes into this State and offers its diploma for registration, the County Clerk will refuse it.

W. C. Barrett: But they don't refuse it.

N. W. Kingsley: If the list together with the law which authorizes and governs it is placed in his hands he must respect it. The law should be placed in his hands together with this list, so that every diploma presented may be compared with it, and if not of one of the recognized colleges he will refuse it.

If a student belonging to such a college demands registration and is refused, his only recourse is to appeal to his college, and if his college wishes its students to practice in the State of New York, it will see the necessity for placing itself before the Society as worthy of recognition; we thus see the power we hold over the colleges. Make such colleges as are not on this list prove their right to be there, rather than put them there and then call them to an account.

The adoption of the list was moved and seconded, so far as it related to dental colleges.

A Member: I move as an amendment that the report of the Committee as to medical colleges be adopted.

Accepted by the original mover, put and carried.

N. W. Kingsley moved that the Secretary of the Society be instructed to have this authorized list of dental and medical colleges printed in suitable form, with such space as may be deemed necessary at the bottom for any possible additions in the future, and that this list also contain above it the Registration Act passed by our State Legislature.

Such publication must show : 1st. That the law authorizes this Society to make such a list. 2d. The list of colleges authorized by that act. 3d. That the list is signed by the President and Secretary of this Society, and the seal of this Society is attached thereto. 4th. That a copy of this list must be sent to every County Clerk in the State of New York, for his guidance.

The motion was carried.

C. D. Cook : I would like to add—And that a certified copy be sent to every recognized dental publication, that it may come to the knowledge of these colleges that they are left out.

The Secretary : If that is left with the Secretary the journals will be taken care of first.

The Secretary read the following resolution :

Resolved, That the Secretary of this Society be instructed to summons the Faculty of the Baltimore College of Dental Surgery to appear at the next Annual Meeting of this Society and show cause why, for alleged irregular granting of its diplomas, the name of said college should not be stricken from the list of colleges whose degrees are recognized by this Society as a sufficient qualification for a license to practice dentistry in this State, and that until such cause be satisfactorily shown, any of its diplomas that may be hereafter issued shall not be accepted by the Dental Society of the State of New York as sufficient authority for the practice of dentistry.

W. C. Barrett : I desire to be heard concerning this resolution. So far as I know and can judge, it is not aimed directly or solely at the college that is named in it. But colleges have in many instances abused the power vested in them, and have graduated students who were totally unqualified. There has been no check whatever upon their power to grant diplomas heretofore, and some of the schools act totally independent of the profession, and as if they were instituted solely for the profit and aggrandizement of the men who conduct them. By their conduct they seem to acknowledge no allegiance to any one, and to hold themselves above all authority, a law unto themselves, if indeed they do not claim to dominate, and be admitted a law unto the profession. It is time that such men were given to understand that, in the State of New York at least, there is a power that can call them to account. Instances are reported in which schools calling themselves reputable have granted diplomas under the most disgraceful circum-

stances. It is not long since a case was reported to me from Germany, in which an eastern college granted a diploma to a man with no previous dental training, a barber of that country, who left for America, and within three months returned with a diploma, having the seal of a college that has heretofore stood high in the estimation of the world. This barber-graduate *could not understand or speak the English language*, and consequently could not have comprehended lectures had he attended any. This thing is becoming a great professional scandal in Europe, and the shadow of suspicion now rests upon every American diploma. It should be remembered that the dental college is peculiarly American, and that such institutions exist nowhere else in the world. It behooves the profession in this country to look sharply after its own honor. If American degrees are discredited abroad, it reflects upon American dentistry in general. We are proud to say that American dentistry leads the world, and that the skill of our professional compatriots abroad is not exceeded by that of the natives of any country. We have representatives in every considerable city of the globe. The greater part of these bear American diplomas. In addition a great tide of foreigners have landed upon our shores, in search of the professional knowledge that could be best obtained here. Men have come here to obtain the best teachings in dentistry, as they have gone to France and Germany to secure the very best medical teaching. But the greed of some of our schools, their strife for pupils, is fast losing for us the distinction that we have long enjoyed, and is bringing discredit upon American dentistry. Nor is it the Wisconsin school that is chiefly concerned in this. Every one knows the character of that fraud; but when schools that lay claim to respectability graduate students without qualification, it is a stab in the back that we are not prepared for and these wounds are being given our profession from quarters where it would be least expected. Europe is crying out against the course of some of our colleges. Shall the profession in America sit calmly down and permit the trailing of our professional flag in the mire? The prime question of to-day in dentistry is, shall the colleges be permitted to graduate students, *sine curriculo*? Shall they confer diplomas at their own sweet will, acknowledging responsibility to nobody? That is the question that I for one desire to see answered. It is to obtain an answer to that question that this resolution is, as I understand, introduced. How will this be secured? Those of you who are aware of the provisions of the State Dental Law, know that only the diplomas of those colleges that this Society recognizes are sufficient authority

for the practice of dentistry in this State. If this Society stamps with its disapproval the diplomas of any school, its graduates cannot enter upon practice here, and should this be done to any college by two or three of the States like New York, Pennsylvania and Illinois, I would like to know how long its doors could be kept open? Thus it may be seen that in this State we hold over the schools a rod of iron, that has the power to check them in any unprofessional work. It is this power that I wish to see asserted. I desire to have demonstrated to the colleges, all of them, that there is a tribunal to which all must answer for their use of the authority granted to them. I would say to some of these men, "You have sneered at our State law; you have affected to despise our Board of Censors; now we will demonstrate to you that this power that you pretend to look down upon, these State laws that you have felt yourselves superior to, will fall upon you and grind you to powder, if you do not carefully and honestly administer the trust that has been given into your hands." (Applause.) I would like to see a useful precedent established. I would like to have it demonstrated that the State societies in those States that have legislation can stamp with disapproval all irregular diplomas, and hold to a strict accountability the schools that grant them. Therefore I shall support this resolution; not because it is aimed at the Baltimore college, for I have no personal knowledge of any irregularities in that school, but because this is the first instance in which we have had charges preferred against a college by responsible persons, and it is a good opportunity to establish a precedent. There is another phase to this matter. Charges are preferred against a college. An opportunity should be given for it to meet them and defend itself. Therefore this resolution may as conscientiously be voted for by the friends of the Baltimore college as by its enemies, if it has any. Colleges, like Cæsar's wife, should be above suspicion. The breath of scandal should not tarnish their name, without an attempt, at least, to wipe it off by an investigation. I have no prejudice against this school, and, as its friend, deem it advisable that an investigation be held, and the party that has done wrong be brought to book. Yet one more point. You see demonstrated the usefulness of legislation, and the question as to what a law is worth is herein answered in seeing this Society established as a tribunal that has power to govern the profession within its bounds. The law is not precisely what some of us would have it, but we know the danger of attempting its amendment. Medical laws that were nearly perfect, have been lost entirely by attempting to tinker them into greater effectiveness. I

hope it will be long before we make any move for the amendment of our law, not because I think it perfect, but because I fear that in attempting to grasp after the shadow we shall lose all that we now have.

E. Parmly Brown: The Baltimore College of Dental Surgery does not seem to be represented here by anybody but myself; but I may say that that institution will be only too happy to have itself thoroughly investigated. If dirty linen is to be washed here, we have a large contract on hand, and before we go into it too extensively it may be well for us to know what we have to do. If the Baltimore College of Dental Surgery has done anything wrong, I have failed to learn of it. The only thing out of the way that I know of is that they have graduated for a school of Virginia. The Baltimore College of Dental Surgery has a board of examiners, or regents, and there is not a graduate on the roll who has not passed them. Many of these regents had never seen the candidates before the latter came before them. If anything wrong has been done, it is strange that I have not found it out. The college, however, will be only too glad of the opportunity to vindicate itself.

W. C. Barrett: This is not a dig at the Baltimore college; we merely take the first college complained of. Let us go to the bottom of this whole matter. If the Society does not have another paper read before it for ten, fifteen, twenty years—if no other subject is discussed—the discussion of this one will do great good.

Wm. Carr moved to amend the resolution by inserting in place of the word "summons" the word "request."

W. C. Barrett: I am opposed to any change. We have the power to do something more than "request." We have the power to make dental colleges understand that we can not only request their presence, but demand it, or summons them to appear.

N. W. Kingsley: The Queen's "request" is a command. In the present condition of affairs, the Dental Society of the State of New York represents the Queen. It can afford to "request," because those who are requested know what it means. I think it somewhat more respectful to say "request," and I think that the Baltimore College of Dental Surgery will recognize what the word means—that it means a summons to appear here.

J. G. Ambler: We are singling out the Baltimore College of Dental Surgery; it has to bear the odium of all this. Dr. Barrett says we don't propose to single out the Baltimore college especially, as we intend, according to the resolution, to bring others to the bar. But the Baltimore college has got to bear the whole brunt of it. If we substitute the word "request" for "summons," I think it will smooth it down a little. I myself have the highest respect for the Baltimore College of Dental Surgery. I have known nothing against it; others may. I will endorse all that Dr. Kingsley has said about the necessity of surrounding ourselves with courtesy.

The amendment was then carried.

N. W. Kingsley: Serious charges have been made against the Baltimore college for graduating men this last spring, or rather conferring degrees upon men who were graduated irregularly. I would like to ask if these charges are recent, or extend over a number of years? If so, I should think some of the other colleges were quite as censurable.

The resolution as amended was then adopted.

The Committee on E. Parmly Brown's resolution (see page 80) reported that owing to the brief time at its command, it was unable to give the matter sufficient consideration, and therefore recommended that the resolution be laid upon the table until the next annual meeting.

The recommendation to lay upon the table was adopted.

A paper by Dr. W. D. Miller, of Berlin, on The Influence of Antiseptics, Filling Materials, etc., upon the Fungi of Dental Caries, was then read by W. C. Barrett, and discussed by the reader, C. E. Francis, C. T. Stockwell, Frank Abbott, N. W. Kingsley, Wm. Jarvie, Jr., and others.

C. E. Francis moved that a vote of thanks be given the essayist for his valuable paper.

N. W. Kingsley moved as an amendment that the thanks of the Society be expressed by electing him an honorary member. The amendment was accepted, and the motion as amended adopted unanimously.

The Committee of Prize Essays reported as follows:

That three papers have been presented for the Whitney Memorial Prize, all of which bear evidence of much labor and thought, and embody many excellent and valuable ideas. The fact, however, that the subjects treated are so widely apart made it a somewhat difficult matter to make a selection for the prize; but after due consideration the Committee decided to give preference to a paper entitled "Microscopical Studies upon the Absorption of the Roots of Temporary Teeth," which re-opens a field of investigation not often invaded, yet extremely interesting as a study pertaining to our specialty.

CHAS. E. FRANCIS,
ALBERT H. BROCKWAY,
S. D. FRENCH,
Committee.

The Chairman added that he had left the envelopes supposed to contain the names of the writers at home, and was therefore unable to say who wrote the paper in question.

N. W. Kingsley: I take great pleasure in saying that Dr. Frank Abbott is the author of that paper.

The essay was then read by its author.

N. W. Kingsley then moved that the Committee of Prize Essays be instructed to examine, in advance of the meeting, such papers as may be in competition, and report at the first morning session.

On motion of Wm. Jarvie, Jr., and by request of the author of the paper, Anatomical Reasons for Dento-Alveolar Abscess of the Hard-Palate, by J. Edw. Line, was read by title only. Also that the paper appear in the transactions. Carried.

The Secretary presented the bill of Chas. Barnes for expenses as member of the Committee of Publication.

The Secretary read the following:

Resolved, That the Secretary of this Society be instructed to make a peremptory demand upon his predecessor in office for the immediate transfer to him of such of the property and records as have not yet been accounted for, and in case this be not complied with, that he be directed to take such legal steps as may be necessary for their recovery.

J. Edw. Line: I move its reference to A. P. Southwick, who at the hotel table yesterday, when this matter was incidentally alluded to, was heard to use the word "Damn." He will do something about it. Carried.

J. G. Ambler stated that he had fully explained to the President, and to the Chairman of the Committee of Business, why he had failed to prepare the paper set against his name in the programme.

The Committee of By-Laws reported the bill of Charles Barnes for \$8.00, and recommended its payment.

The report was received and the bill ordered paid.

The usual order on the Treasurer for \$100, in favor of the Secretary, was moved by N. W. Kingsley, and the amount ordered paid.

The election of permanent members being in order, the following gentlemen were elected. J. N. Race and J. H. Holly, acting as tellers: Frank Abbott, New York; B. T. Mason, Phoenix; John J. Pitts, Brooklyn; Myron D. Jewell, Richfield Springs; and Albert M. Wright, Troy.

The election of officers for the ensuing year resulted as follows:

President—L. S. Straw, Newburgh.

Vice-President—Frank B. Darby, Elmira.

Secretary—J. Edw. Line, Rochester.

Treasurer—H. G. Mirick, Brooklyn.

Correspondent—W. H. Atkinson, New York.

Censors—Wm. Jarvie, Jr., Brooklyn, II district; S. B. Palmer, Syracuse, V district.

The President appointed the following committees, and announced that he would make the balance of the appointments sometime in the future and notify the appointees:*

Arrangements—W. F. Winne, E. C. Baxter, Albany; A. C. Rich, Saratoga Springs.

Dental Law—Wm. Carr, 35 W. 46th St., New York; A. M. Holmes, Morrisville; and A. M. Wright, Troy.

Publication—J. Edw. Line, Frank French, Rochester; W. C. Barrett, Buffalo.

On motion the Secretary was instructed to cast the vote of the Society for Dr. W. D. Miller, of Berlin, for honorary membership.

The Secretary cast the vote, the result was announced, and Dr. Miller declared duly elected an honorary member of the Society.

Dr. Ambler: I move that the Committee of Arrangements be instructed to engage for our next meeting a smaller room, with rooms adjoining for the exhibition of appliances. Carried.

It was moved that at his earliest convenience the President appoint delegates to the American Dental Association, which meets at Saratoga in August next. Carried.

M. E. Elmendorf: I move we adjourn! Carried.

* See Appendix.

MICROSCOPICAL STUDIES UPON THE ABSORPTION OF THE ROOTS OF TEMPORARY TEETH.

BY FRANK ABBOTT, M. D., NEW YORK.

WHITNEY MEMORIAL PRIZE ESSAY.

The fact that temporary teeth, previous to the appearance of the permanent ones, are considerably reduced in size, often lacking roots, often consisting only of a thin shell and exhibiting a corroded festooned surface, has long since attracted the attention of observers. It has never been doubted that a persistent, though graded, irritation causes the absorption; but what the real cause of this irritation is we cannot tell. The idea that in all cases the pressure of the growing permanent tooth is the direct cause of the irritation must be abandoned, since clinical observation shows that the absorption of a temporary tooth may take place, though far distant from the permanent one; nevertheless we can maintain that the growth of the latter, indirectly at least, causes an irritation, and the consequent absorption of the roots of the temporary teeth.

The assertion of Tomes that the absorption is due to the presence of freely vascularized papilla does not explain the decrease of the dental tissues, for the papilla is nothing but medullary tissue, such as we meet with in any part of the organism where one tissue is about to change into another. Such a papilla can be the cause of the absorption, as well as its result. Another assertion, that the medullary cells eat out the dental tissues by their active growth, or by their amœboid motions, is insufficient for the explanation of the loss of the lime-salts in the dental tissue, the presence of circular or semi-circular excavations and bays, so characteristic of the melting process of the cementum and dentine of deciduous teeth.

Since we know that pieces of dead bone or ivory may be absorbed with figures similar to those found on the surface of temporary teeth, the idea possibly becomes admissible that, owing to the presence of an acid, first the lime-salts are dissolved out within certain territories of the dead bone tissue in a merely chemical or passive way, whereupon

the soft medullary tissue penetrates the spaces thus established. Quite different, however, will be the conception of this process if we bear in mind that the temporary teeth, as well as the permanent ones, are made up of living tissues, and an active participation of these tissues must be expected in the process of transformation of the dental into that of medullary tissue. As the process of absorption is closely allied to the process of inflammation, and active changes of the dental tissues have been proven to follow inflammation beyond any doubt, we may *a priori* expect such changes of the bone tissues of the temporary teeth in the process of absorption also. I shall try to prove in this paper that such changes really do occur. In the light of the most advanced modern views concerning the structure of the dental tissues, we consider cementum, dentine, and enamel as endowed with properties of life, or in other words as pervaded by living matter in the shape of an extremely delicate reticulum. In this view not only the cement corpuscles and their coarser offshoots contain living matter in the shape of so-called "granular protoplasm," but the whole basis-substance present between the cement corpuscles is alive also, only the minute meshes of the living reticulum holding a gluey basis-substance saturated with lime-salts. In the dentine, not only the tenants of the dentinal canaliculi (the dentinal fibers) are alive, but the whole mass of gluey and calcified basis-substance between the dentinal canaliculi is also living. The same holds good for the enamel, in which the delicate fibrillæ between the enamel prisms have positively been proven to be living matter, but the prisms are pierced by living matter, though the latter has not been demonstrated directly, but indirectly in morbid changes of enamel. Of the cementum we know that each cement corpuscle occupies the center of a more or less globular territory of basis-substance. If, therefore, circular fields of absorption appear in the process of inflammation and absorption of the cementum, we can readily trace these territories in following out the portion affected by the process of absorption. But how shall we explain the bay-like excavations in the dentine and enamel so often seen in reduced temporary teeth, where there is nothing known of territories? Here the first difficulty sets in, due to the lack of knowledge of the history of the development of dentine and enamel. Czermak's interglobular spaces indicate the presence of such territories in the dentine, the presence of which, however, can be proven only after accurate researches in the history of development.

Granted that the dissolution of lime-salts takes place in globular territories in the dental tissues, the next question will be, how do the

medullary elements appear in such spaces? Do they migrate or penetrate from without, or do they originate, in part at least, from the living material present in all dental tissues?

ABSORPTION OF CEMENTUM.

The process of absorption of a provisional tooth begins on the cementum of the roots. The latter exhibits before the beginning of this process the features of cementum of permanent teeth. Primarily, the absorption is marked by the appearance of the well-known fields so commonly met with in the process of osteitis, that is excavations on the surface, either semi-circular or composed of a varying number of semi-circular festoons, all of which are filled with medullary elements, multinuclear bodies, or a delicate myxometo, in part a bony, in part fibrous connective tissue, blending with the adjacent myxometous or fibrous pericementum. The communication of the excavations with the pericementum is either widely gaping or through a narrowed neck on the surface of the cementum. Sometimes, however, in the sections the excavations appear isolated, without any communication with the surface, which latter instance, however, will certainly not entitle us to deny the existence of such a communication on a plane above or below that of the section. In the excavations the cementum is unquestionably reduced first into medullary, afterward into myxometous or fibrous tissue. By closely watching excavations of a more recent date at the periphery of those in communication with the pericementum, we notice that the lime-salts and the basis-substance proper are missing, and are replaced by a uniformly granular protoplasm, or a varying number of faintly marked medullary elements, each of which may contain a central nucleus. We can trace a gradual change of the tissue of cementum from a dissolution of lime-salts to the appearance of a mass of granular protoplasm, and at last to the formation of medullary corpuscles. The circular shape of the excavation is in all cases undoubtedly due to a dissolution of the lime-salts, and afterward of the basis-substance proper, within the territory of a cement corpuscle. Sometimes we see an enlargement of the lacuna and the cement corpuscle itself, the latter splitting up into a varying number of glistening lumps, which are readily stained by an ammoniacal solution of carmine. In other instances the whole territory of a cement corpuscle is transformed into protoplasm, and the reappearance of such protoplasm is traceable through broad offshoots to neighboring cement corpuscles. In a third instance a varying amount of the territory has assumed a delicate fibrous appearance, caused by an early grouping of the medullary cor-

puscles into fibrillæ. In neither of these instances will it be doubted that the cement corpuscles themselves, or the living matter held in their territories, has in an active way taken part in the reappearance, first of protoplasm, and afterward of medullary corpuscles. The theory that immigrated medullary corpuscles, or "leucocytes," have replaced the former cement tissue, must be abandoned as soon as we can trace a gradual transformation of the tissue of the cementum into medullary tissue. The latter immediately assumes the characteristic features of a myxometous or fibrous connective tissue, in connection with the pericementum (Fig. 1).



FIG. 1.—ABSORPTION OF CEMENTUM.

C.—Cementum whose corpuscles are in part in a process of division. *F.*—The basis-substance of cementum transformed into a delicate fibrous tissue, in connection with a considerably enlarged and split up cement corpuscle. *M.*—Multinuclear protoplasmic mass, sprung from the cementum after liquefaction of its basis-substance. The large offshoots of this mass show the process of transformation of the basis-substance into medullary corpuscles. *F. C.*—Fibrous connective tissue, the result of the liquefaction of cementum. Magnified 500 diam.

From this point of view there is no difficulty in explaining the appearance of multinuclear bodies, so called "myelo-plaxes," in the dissolved territories. We know that such formations represent a stage of development of cementum, and they simply reappear as soon as the

(To be concluded in the October number.)

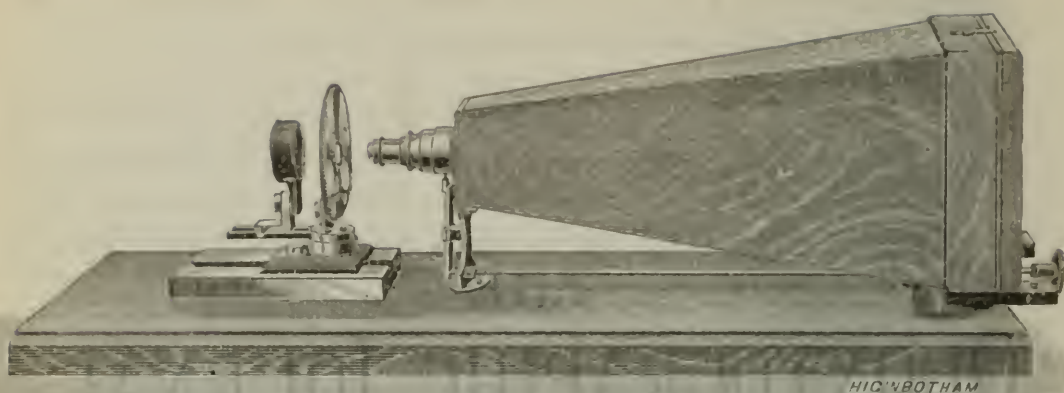
THE ODONTOGRAPHIC JOURNAL.

VOLUME V.—*October*. 1884.—3.

PHOTO-MICRO CAMERA.

BY H. F. ATWOOD, F. R. M. S., ROCHESTER, N. Y.

At our meeting last year at Chicago, Mr. William H. Wamsley read a valuable paper on photo-micrography. No doubt many others have, like myself, become enthusiastic on the subject, and have done much work in that direction. Benefiting from the hints derived from Mr. Wamsley's paper, I some months ago attached my Griffith club microscope to a camera, and with it did some very creditable work. It was not, however, satisfactory to me wholly, and the thought occurred to me that if a combination of camera and microscope could be produced at a reasonable cost, it would, like a country newspaper, "fill a long felt want." I finally submitted to Mr. Ed. Bausch a drawing that, besides conveying an idea of what I wanted, represented the consumption of an unknown quantity of brain tissue. He went to work on it, corrected my errors, added new features, and as a result I have the pleasure of presenting and describing to you to-day an apparatus capable of doing any work in photo-micrography perfectly, and that can be put in the hands of the microscopist at an expense less than that of ordinary camera attachments for his microscope. As the apparatus is before you, it is hardly necessary that I should describe it in detail. The coarse adjustment is made at rests. On reaching an approximate focus the stage is secured by a friction screw. The fine adjustment is



controlled by a milled head placed directly under the ground glass focussing plate, and acts by a lever on the nose piece carrying the objective.

The advantage of this over tight cords running your fine adjustment fixtures is, I think, apparent. The sub-stage has a fitting to receive any ordinary illuminating apparatus, and by a simple device a condenser can be accurately centered. Advantages: First, Clearer definition than photographing through an eye-piece. This is so well known that it need not be argued. Second, The microscopist is not obliged to dismantle his microscope every time he wishes to photograph, and per contra is not obliged to upset his photo outfit to examine an object under his microscope. Both are at all times ready for their respective work. Other advantages in minor details will occur to any one who examines it closely. I will add that a series of amplifiers are being devised for increasing range of power; and for the purpose of accurate focussing with high powers the ground glass plate is replaced by a plate carrying an eye-piece designed to focus on the aerial image, thus securing accuracy without material enhancement of cost. The plate-holder and method of adjusting it is that of the Rochester Optical Company, who have done so much to advance amateur photography. One word about the dry plates. I have tried various makes, but have never felt fully satisfied until I used those made by the Messrs. Forbes of this city. They give a very dense negative, and I find this a great advantage in micro work. Their latitude of exposure, too, is quite elastic, and that is a great desideratum, especially for the tyro.

A discussion followed as to whether it was advisable to work with or without eye-pieces.

Mr. Atwood said he obtained a denser and clearer plate without an eye-piece.

President Cox said he had obtained the best results with an eye-piece.

Dr. Blackham took the same ground. He thought the microscope had been manufactured with the intention that the eye-piece should be used in photo micrographic work. He thought the prejudice against eye-pieces unreasonable. After an image had been focused, the instrument was thrown out of adjustment if the eye-piece was removed.

Prof. Burrell said he had started out with a prejudice against eye-pieces, but notwithstanding he had found that better photo-micrographic work could be done with than without them.

NOTES ON "RECENT PROGRESS."*

IN MECHANICS.

BY MAJOR WILLIAM STREETER, ROCHESTER, N. Y.

The progress in accuracy of mechanical work may be brought to notice in the following statement: James Watt in a letter to a friend claimed that he had attained remarkable accuracy in boring a cylinder of a steam engine, and fitting its piston so closely, that "The thickness of a half-crown could not be introduced between them."

Standard gauges are now made that show errors of one hundred-thousandth of an inch, and work is exacted to one fifty thousandth of an inch. Such accurate work is not, however, generally necessary, except in the construction of gauges. But these standard gauges are the means provided for keeping within proper bounds in the production of thousands of pieces of the same size and shape, in which a certain amount of variation is allowable, both plus and minus. This allowance of difference is necessary in the fittings of bearings and journals; for, if made with the extreme accuracy of gauge work, the surfaces would cohere, and speedily destroy each other. In the perfect fit of plug and ring gauges, where the plug is inserted in the ring, both being of hardened steel and both at the same temperature, it is necessary to keep the plug moving, or the easy sliding fit will change to a driving

* Bulletin of Rochester Academy of Science, June, 1884.

fit. A plug gauge of three quarters of an inch in diameter, which is three ten thousandths of an inch smaller than the ring, is a loose fit, and will drop through the ring.

To make work interchangeable, line measure is perhaps the best standard for practical reference. This measurement is by means of engraved lines on a ruled steel bar, the tests being made by means of the microscope. A hardened steel bar is used, the subdivisions being made with a diamond. The Pratt & Whitney Co., of Hartford, Conn., have lately constructed a set of straight edges very remarkable for accuracy considering their great length. These straight edges are twelve feet long, and two-and-a-half in. face. They are in the form of a chord and segment of a circle, the highest point of the curve being 20 in. Between the chord and the curve the casting is a lacing of diagonal braces. Recently some remarkable tests were made with these straight edges, one being a test of flexure. The straight edge was placed on a true and perfectly clean planer bed, with a shim of tissue paper under each end, which raised the entire straight edge so that another slip of paper could be moved under its face from end to end. even when the weight of two hundred pounds was placed upon the center. The tissue paper was perhaps the one-thousandth of an inch in thickness, and if the flexure had been one-tenth part of this amount, it would doubtless have held the slip of paper fast in the center.

This will, I trust, serve to show the refinement of mechanical appliances when compared with the near past. Then the thickness of a half-crown was the test of mechanical accuracy; now in many kinds of work in our best shops, one ten-thousandth of an inch is a variation altogether too great to be admissible.

IN OPTICS.

BY MR. ED. BAUSCH, ROCHESTER, N. Y.

As I was out of town at the time of the last meeting, and was not informed until four days ago that I was expected to report on "recent progress" in optics, I have necessarily given little time to the subject. Besides, as new principles in optics are not by any means an everyday occurrence, and as new devices are speedily brought to the notice of the public by popular literature, it is quite a task to speak of anything as new or "recent."

There are two things, however, that come to my mind, which, although they are not new, are not generally known, and may be interesting. The first is a microscope objective, which I believe was originally devised by Prof. Abbe. It gives a quick variation in power by varying the two systems, and gives good results at the two extremes. The front lens is not, as ordinarily, a convex-converging lens, but an achromatic concave lens, which diverges the rays. That portion of the diverging cone of rays which strikes the posterior system is therefore enlarged, as its distance from that system is increased, and this causes an enlarged image, while it has a contrary effect when the lenses are brought closer together. The powers which Professor Abbe gained by this method were those varying between five and ten inches of focal length, and the objective which we make varies from three to six inches. The great advantage in low powers is, that it materially reduces the working-distance, being as little as one half inch with a three inch objective. This property will probably not admit of its adaptation to higher powers.

A few weeks ago Prof. Wm. H. Rogers, of Cambridge, paid us a visit, and brought to my notice an objective which had been made at his suggestion by Mr. Robert Tolles, of Boston, recently deceased, and which he used especially in the examination of fine rulings on opaque bodies. Prof. Rogers wished another such objective, and empowered me to make one. I have been working at one, and had hoped to show it this evening, but was unable to finish it in season.

The method of illuminating opaque objects is by direct light through a prism contained in the objective. The light is placed at one side of the microscope, and is reflected by the prism through the front system, and condensed or refracted by it upon the object at the same angle at which the image is carried back through it. The prism is a rectangular one, and occupies about one quarter of the aperture, and I find that it affords sufficient illumination for all purposes. It does not interfere with the definition as much as one would suppose from the considerable space which it occupies. I have found so far that it causes a milkiness or blur in the image from a second reflection which takes place internally in the front system; but I believe that this difficulty can be obviated, and that this method of illumination can be applied in general microscopic work. It will certainly prove gratifying and advantageous to view opaque objects with a one-quarter or one-fifth objective, especially when all other methods of illumination have signally failed.

IN BOTANY.

BY MRS. WM. STREETER, ROCHESTER, N. Y.

New stations have been discovered this season for the following plants, rare or unknown, in this immediate vicinity: *Jeffersonia diphylla*, *Erythronium albidum*, and *Arenaria stricta*. A white *Cynoglossum officinale* is reported from Wayne county.

The *Botanical Gazette* contains a list of the botanical papers, 99 in all, of the late Dr. Geo. Engelmann, extending over a period of fifty-one years of a hard-working physician's life. "Lives of great men all remind us."

McMillan & Co. have brought out one of Grant Allen's books, "The Colors of Flowers, as Illustrated in the British Flora." Why is the buttercup yellow, the stitchwort white, the dog rose pink, and the harebell blue? Why are the central florets of the daisy yellow, and the ray florets white? Why does sky blue prevail among the Veronicas, yellow among the St. Johnsworts, and white in the umbellates? These questions are briefly answered by the light of evolutionary biology.

Appleton & Co. have published "Flowers and their Pedigrees," also by Grant Allen,—a book for non-technical readers.

Mr. J. B. Armstrong writes in regard to the red clover in New Zealand, that there is reason to believe that it is becoming modified in its structure so as to admit of the visits of insects not known to visit it in England. Prof. L. U. Bailey, Jr., of the Botanic Gardens, Cambridge, Mass., sells catalogues of North American Carices for five cents apiece, and solicits notes and exchanges.

Dr. E. L. Sturtevant has recently published some results of his study of corn. He gives five species, viz.: pop corn, dent corn, soft corn, flint corn, and sweet corn, besides several varieties.

Curtiss' seventh fascicle of North American Plants was distributed in February last. Mr. J. B. Ellis delivered his 12th and 13th century to his subscribers in April.

CONDUCTORIAL.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

“ Dr. Peirce offered the following as a substitute for the resolution on the same subject adopted last year :

“ Resolved, That this Association insists that no boards hereafter organized and becoming connected with this body shall confer degrees or titles of any nature. . . .

Then New York may enter, if she will, by the door.

“ Dr. Peirce again (after the third resolution adopted last year had been rescinded) offered his resolution. He thought its passage might save other States from making the same mistake New York had.

Has New York made a mistake ? If she has, why palliate or excuse it ? If she was wrong a year ago, how comes it that she is right now ? Has she ceased to confer a degree or title ? Will she discontinue the practice ?

“ THE NEW CHEMISTRY.”

We need not say that in the choice of this gentleman we acquiesce most cordially.—*Republican paper.*

“ Acquiesce ” is good ! It’s the word the boy used to express his entire satisfaction with the situation when he wouldn’t eat his supper—because he couldn’t get it. Blank, however, does not acquiesce ; he aquafortises.—*Democratic paper.*

PELLETS.

Books, Pamphlets, etc., must go over another quarter.

Indecent concealment of the person—a Mother Hubbard dress.

Did we hear some one ask the abiding place of the “ optical center ” ?
Rochester, sir, Rochester.

Mr. L. R. Sexton, until recently sole agent for the celebrated Gundlach objectives, is dead.

The photo-micro apparatus figured in our first article is made by the Bausch & Lomb Optical Co. The price as shown is \$15.00.

We had no room in the July number for other matter than that of the Proceedings of the State Society, and this month, though we publish 56 pages, we have but little more.

Directories of Rochester, dental or other, if published before August 1, 1884, are incorrect from beginning to end, and not to be relied upon; for the whole city has been re-numbered—the city surveyor says for all time.

The Transactions of the Dental Society of the State of New York for 1884 were expressed to the several district secretaries September 8th, and should now be in the hands of members of both State and district societies.

The "Prophylactic" brush is the invention of Dr. M. L. Rhein, of 7 West 38th Street, New York. It is the most satisfactory thing of the kind that we have ever used, and the only one that readily reaches the buccal and posterior surfaces of the superior third molars.

The editor of the *New England Journal of Dentistry* waxes wroth in the September issue, saying, among other wicked things, that "such hired prayer and pietastery, be it Catholic or Protestant, is popery," which settles it. Pie and pietasters, be they Catholic or Protestant, must go!

Mr. Ernst Gundlach, the well-known maker of fine objectives, has associated himself with three other gentlemen, each an expert in his special department, and may be found personally or by letter at the new factory in Stone Street, this city. The firm will be known as the Gundlach Optical Company.

The speech of the late meeting of the State Society was made by Dr. M. E. Elmendorf, of Brooklyn, whose words marked an epoch not only in the meeting in question, but in the history of the Society, and will cause posterity to point with pride to the records depicting the closing scenes of the fourth session. His words, the last of which moved every man in the room, were: "I move we adjourn."

[Continued from page 96 of July Number.]

basis-substance of an already-formed cementum is dissolved or liquified. In fact, nothing else is required but a reformation of basis substance and its recalcification, in order to reproduce new bony tissue, such as we often meet with on the periphery of absorbed cementum.

The result of the absorption is, next a myxomatous or fibrous connective tissue freely supplied with newly formed blood vessels. In this tissue an active new formation of bony trabeculæ of bone takes place, characterized by the presence of large and irregular bone corpuscles. The widened socket, or dissolving surface of an absorbing provisional tooth, is not infrequently filled with newly formed bone. The newly formed layer of cementum in part shows circular fields (territories) of bone tissue, each of which may contain a varying number of bone corpuscles, or there is a uniform reduction of the original cementum, the boundary of which is made up by regularly arranged medullary corpuscles, so called "osteoblasts."

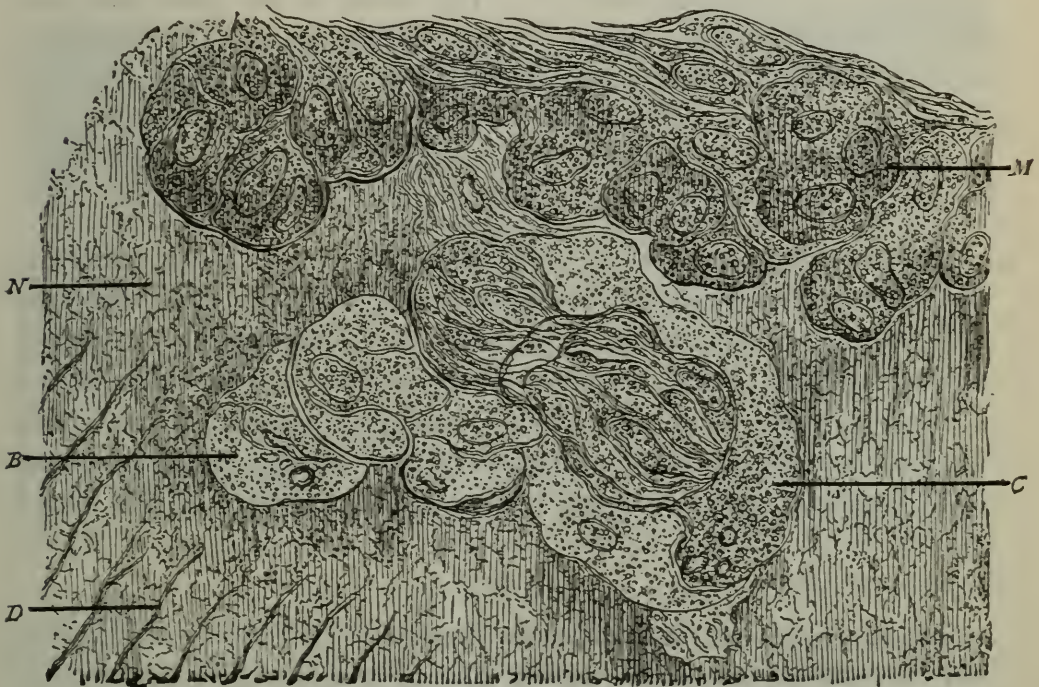


FIG. 2.—ABSORPTION OF NECK OF TOOTH.

N.—Dentine of neck of tooth not supplied with canaliculi. D.—Canaliculi of dentine stopping short of the surface of the neck. B.—Bay-like excavations in the middle of dentine, filled with a pale and finely granulated protoplasm, nuclei beginning to appear. C.—Excavation filled with coarsely granular protoplasm, tending toward an active new formation of medullary corpuscles. M.—Multinuclear protoplasmic bodies, the so-called "myeloid cells," in connection with fibrous connective tissue on the surface. Magnified 600 diam.

On the neck of the tooth the excavations penetrate not only the layer of the cementum proper, but also the layer of the subjacent dentine, which we know to be destitute of dentinal canaliculi. Here again we observe at first a dissolution of the basis-substance in globular fields, which appear filled at first with a finely granular protoplasm, lacking nuclei, afterward with usually nucleated medullary corpuscles, and at length with a slightly fibrillated tissue, the latter undoubtedly originating from a splitting of the medullary corpuscles into a number of delicate spindles. The surface of the neck of the tooth likewise exhibits the characteristic bay-like excavations which are filled with nucleated medullary corpuscles, or with multinuclear protoplasmic bodies. From what I have seen, I cannot doubt that the nuclei under all circumstances are secondary formations, and cannot be regarded as the future bone corpuscles. A territory of bone tissue will form only after the protoplasm has assumed a uniform granulation, and the bone corpuscles will develop out of this protoplasm, by an increase of living matter at certain regular intervals. The result of the absorption and reappearance of the embryonal condition of the tissues constituting the neck of the tooth, results in the formation of new bone tissue, either in the shape of globular fields (territories) of newly-formed bone tissue, or in the formation of a thin layer of regularly lamellated bone tissue, blending with that formed out of the cementum of the roots.

Bodecker, in his article on the distribution of the living matter in the dentinal tissues (*Dental Cosmos*, 1878-79), describes and illustrates the neck of a tooth, calling it an anomalous formation of cementum. From what I have seen I cannot doubt that his figure is taken from a deciduous tooth, exhibiting newly-formed bone-tissue on the neck. Unquestionably such bony formations are not lasting, but are reformed into medullary tissue with the advancing absorption of the dental tissues, either leading to the formation of new bone or of fibrous connective tissue.

The most striking features in the dentine of deciduous teeth are the bay-like excavations on the surface after a complete disappearance of the covering cementum. The excavations contain medullary corpuscles, multinuclear bodies, or fibrous connective tissue, in connection with the surrounding pericementum, or periodontium. The appearance of such fields in the dentine gave rise to the theory that a foreign tissue grows into the dentine, destroying it in the manner in which dead bone is destroyed. If, however, we bear in mind that the tissue of dentine is composed of globular territories, the same as that of bone,

we at once are in the position to understand the striking appearance of globular fields of absorption in the dentine. The question can only be, is the dentine absorbed in a merely passive way, or does it share in the formation of medullary tissue, so long, at least, as it is the seat of life in itself? My researches strongly point in favor of an answer in the latter direction. In several instances I have been able to trace a slight widening of the dentinal canaliculi on the border of the fields of absorption, with an increase of living matter in the canaliculi. Such features are very common in the process of caries, where the dilatation of the canaliculi at the expense of the intervening basis-substance, and a new formation of medullary elements out of the tenants of the canaliculi, is a very common occurrence, provided that the caries attacks the living dentine. Circumscribed bay-like excavations, such as are common in the absorption of dentine, I have frequently met with in caries.

ABSORPTION OF DENTINE.



FIG. 3.—ABSORPTION OF DENTINE.

D.—Dentine provided with unchanged canaliculi. *B.*—Bay-like excavation in the dentine, containing finely granular protoplasm, which is about to form medullary corpuscles. *F.*—Medullary corpuscles elongated and split into delicate spindles, the future fibrous connective tissue. *M.*—Globular protoplasmic masses, the predecessors of globular territories of bone-tissue. *G.*—Globular territories of bone-tissue, with central bone corpuscles. *L.*—Lamellated bone-tissue surrounding the outer surface of the absorbed tooth, or the inner surface of its socket. Magnified 600 diam.

Sometimes such excavations, in caries, form independently of the surface destruction, and with the lower powers of the microscope even a well-versed eye, under these circumstances, would experience diffi-

culty in discriminating between carious destruction and absorption of temporary dentine. Higher powers, to be sure, reveal the presence of micro-organisms in the former process, which are lacking in the latter. The first step seems to be identical in both instances ; a dissolution of the lime-salts, or a displacement of the lime-salts, by the liquefaction of the glue giving basis-substance. After this, medullary elements arise out of the liquefied dentine which are destined to decay in caries, and, on the contrary, proliferate in the process of absorption, with the result of the new formation of medullary tissue. In caries the process of softening, or the removal of the calcified basis-substance, results in the death and putrefaction of the tissue ; that is, its replacement by micro-organisms. In the process of absorption, on the contrary, it ends in an active proliferation of medullary tissue, with the non interference of micro-organisms.

The result of the latter process is the same whether it occurs on the cementum, on the neck of the tooth, or in canalicularized dentine. The newly-formed medullary tissue consists either of single medullary corpuscles, usually with one oblong and faintly marked nucleus, or in the shape of larger protoplasmic masses with a varying number of oblong nuclei, so called "myeloid cells." At the border of the bays I have sometimes been able to trace delicate thorny projections from the multinuclear masses into the unchanged basis-substance of the dentine. Sometimes I saw broad offshoots of the multinuclear bodies penetrating the widened dentinal canaliculi, and being in direct union with the dentinal fibers. The latter feature, especially, seems to point strongly toward an organic connection between the unchanged and the dissolved out dentine.

The multinuclear bodies are, as is well known, the future territories of bone-tissue, and therefore predecessors of bone-tissue. The formation of bony territories can easily be traced on the surface of absorbed dentine. Just as in normal development of bone-tissue globular territories first appear, and afterward lamellated bone-tissue, so also in absorbed dentine, first multinuclear bodies, afterward globular territories of bone-tissue, and at last lamellated bone-tissue forms on the surface, the latter producing, in many instances, a continuous layer of bone all around the absorbed tooth. This feature is correctly observed and described by Tomes.

As to absorption of the enamel I can say but little. It is well known that bay-like excavations are seen in this tissue, in no way differing from those of cementum and dentine. From this fact it would follow

that all the theories hitherto advanced with regard to the development of enamel must be erroneous, and there must be an arrangement in the enamel forming tissue leading to the production of territories in a manner similar to that of dentine and cementum. It seems that the process of destruction starting on the surface of the enamel, is in all instances caries, and not absorption. The latter process attacks enamel only from within. After most of the dentine has been absorbed and transformed into myxomatous tissue, the enamel is attacked and thinned to a varying degree by the same process. Thus it becomes intelligible that the shell of enamel left is coated by a layer of lamellated dentine, which is continuous all around the remnants of the provisional tooth.

Since we know that enamel is a live tissue in a living tooth, we may anticipate its reduction into medullary tissue in the process of absorption. Whether or not such a breaking down of enamel occurs and its consequent participation in the formation of bone tissue, I am unable to say.

ON THE TRANSPOSITION OF CERTAIN FUNCTIONS OF THE TEETH.

BY J. EDW. LINE, D. D. S., M. D. S., ROCHESTER.

A glance at the species, varieties, individuals of the animal kingdom, is sufficient to convince even the casual observer that teeth have several functions, the chiefest of these being what is conceded in the case of most, if not all animals, the mastication of alimentary substances. And by mastication we do not mean merely the trituration, but also the seizure of food, its laceration, division, which are but a few of its many modifications. Animals whose food is derived from the vegetable kingdom grind, triturate, reduce to a fine, and in some cases the finest possible, condition all food fit for alimentation and whose appointed end is the maintenance of their own economy. It is retained, as a rule, in the cavity of the mouth until its every particle has been exposed to the mechanical action of the teeth and the solvent effects of the secretion of the salivary glands. And this, in the case of the vegetable feeders, is a very necessary process; for without thorough mastication and insalivation, the reduction of the starchy matter in which such food abounds would be incomplete, and as consequences of such incomplete reduc-

tion, other and remote organs would be required to perform work the quantity and quality of which would overtax them and their resources; or the food would be rejected or voided nearly, or quite, as replete in nutritious ingredients as when first ingested. In the case of the flesh-eaters the insalivation of the food is of little consequence further than the wetting, oiling, greasing of the mass to aid it in its passage to the more distant digestive organs; but the tearing, cutting, in a word full of meaning, the *mangling* of the food, is of the greatest moment; for by this process the surface subsequently exposed to the secretions of the several organs is many times multiplied and the mass more readily acted upon preparatory to its assimilation. It is thus seen that mastication is an important function, and the further pursuit of the matter would add little to the plain statement, that so far at least as the lower animals are concerned, work is the primary function of teeth and those other parts that go to make up the dental apparatus. But teeth have other functions which are said by the comparative anatomist to arise "out of the relations of co-existence with other organs and endowments, or from a special developement of the organs themselves." These functions are termed secondary, and may be briefly mentioned as exhibiting themselves in speech, as ornaments, as discoverers of age, as characterizing sex, as weapons of offence and defence, as a means of anchorage, as implements of transport(— *Owen*); but the greatest of these, greater even than mastication, in the civilized member of a civilized community is ornament or personal adornment.

But before going further, and that we may get at the subject in form for discussion, we submit the following propositions: 1st.—Among animals, other than man, mastication, including the several modifications already alluded to, is the primary function of teeth. 2d.—Among a very small proportion of animals other than man, and in fact including the lower orders of men, ornament or personal ornament is a secondary function.

Enough has been said upon these two points to show much, if not everything, in their favor, hence there dismissal here and now. Then we have 3d.—In civilized communities of men ornament or personal adornment is the primary, and mastication a secondary function. 4th.—This transposition of function is more or less complete, and always directly as the civilization of the individual and the community of which he is a factor.

That our third proposition is true we cite a number of facts that as dentists we are daily compelled to face: In the first place we meet with

children to the care of whose teeth not a thought is given by the parents till the anterior teeth show the familiar green stain, begin to decay, or melt away before solvent secretions the nature of the action which is much guessed at, but continues as yet quite unknown. The thought of looking into the child's mouth to note the condition of teeth ordinarily out of sight, unless lead to it by an aching member, occurs to so few parents that each of us could, in all probability, count such families in our practice once around the fingers of both hands. That it is looks, not use, that is uppermost in the parents' mind, is evident from the frequency of the request to remove the stain from the child's front teeth,—“just those four, you know.” How the child eats is of secondary importance; how he looks, primary and vital.

Again, we are called upon by, say a well-dressed and (her teeth excepted) refined (?) woman, with the request to examine her teeth preparatory to an appointment. Her teeth are clean, as clean as a stiff brush and coarse (or fine, as the case may be) powder vigorously applied at long intervals, can make them; but with this clean state of the teeth we find abnormally red and swollen gums, with patches of lacerated tissue dipping down between the teeth. At the first view of the case we say—Hard brushing at long intervals, rather than the better rule of little and often. Her occasional respect for herself, and the commendable desire to show us a little of that same commodity, are appreciated at their full value; but the words all but escape us, “Brushed for the occasion.” At home, no thought of teeth if they give no trouble; abroad, they must correspond with articles especially donned for show; their function for the time being is ornament or personal adornment. And again, how often do we hear the half-formed determination to let fillable or irregular, but otherwise good teeth go, that their owners may confessedly obtain artificial teeth free from the blemishes of decay, or misplacement in the alveolar portions of the jaw. And who among us has not from time to time extracted by request a somewhat troublesome but fillable back tooth, simply because it was a back tooth, and for a person who would suffer for days, perhaps weeks, rather than part with one from the anterior portion of either jaw? The almost daily request to fill the front teeth and let the back ones go on to destruction and the forceps, or to fill the front teeth with gold and the back ones with something cheaper, is off the same piece—teeth primarily for looks, incidentally for use.

Our fourth proposition, that this transposition of function is directly as the civilization of the individual, seems to us to be closely related to

the self-evident. Among members of the lower orders of men teeth are as a rule regarded as of value because of their usefulness in preparing for further digestion and for assimilation the various articles used as food ; and the more labor involved in the preparation of such articles of food, the greater the value attached to these with us much abused organs. To repeat—low down in the scale of civilized beings teeth are valued for what they do, and not for what they appear ; but as we ascend in the scale, less and less importance is attached to their usefulness, and more and more to their investment with what belongs to decorative art. It will thus be seen—must be seen, it seems to us—without any attempt at argument, that teeth when viewed from the utilitarian standpoint, belong to the savage and his compeers in civilized life who have not yet arrived at angelhood ; while from the æsthetic standpoint their primary function ranks with human hair. In other words, and to repeat our proposition—this transposition is directly as the civilization of the individual and the community in which he lives, and is becoming more marked day by day.

Having stated the case, it is now no more than fair for us to indicate the causes that have contributed, and are still contributing, to this change. It is not necessary to go back to the physical and mental activities that have led to the invention of reducing and refining apparatus and methods, whereby the food of civilized man is prepared for the stomach long before it reaches his mouth. We have this product at hand, and *must* use it—must, for there is no alternative. We would not go back to the ways of our remote ancestors, nor even to those of some of our unfortunate neighbors ; and more than that, the demands of modern society are such that we could not do so if we would. Vegetable food is softened and chemically changed by cooking, so that to be saturated with saliva for digestive purposes, it needs only to be retained in the mouth a short time, rolled from side to side by lips, cheeks and tongue, and occasionally mashed by the ever-moving lower jaw ; while animal food, in addition to its being thoroughly cooked, is cut, sliced, shaved, chopped, by the help of knife and fork, till the surface made ready for the direct and solvent action of the gastric juice, is commensurate with that of a plate of that mysterious something very properly called hash. Here we have not a division of labor, but worse—worse for the teeth,—a shouldering of all labor, first on the furniture and methods of the kitchen, and secondly, on the stomach and more remote digestive organs—the mouth and its dental contents being a mere hole in the wall, a sort of rapid transit from Bridget to

belly. In some cases there is compensation for this—for instance, in those persons who grind their teeth at night, or while at work during the day; and also in the educated tobacco chewer, the preservation of whose teeth is due less to the antiseptic effects of the weed than to the exercise necessary to its artistic manipulation. It is thus seen that work is essential to the making of good teeth, also to the keeping of them good. Exercise makes a tooth, as it does any other organ, hungry. Hunger means a right condition of the tooth to appropriate a right quantity of a right quality of nutritive material, and that a tooth in this state feed itself, it is only necessary to place this material within the tooth's reach. This view of the matter may be fairly regarded as an illustration of the principle of natural selection—the animal as conditioned by his environment, teeth in their relations to the work they are called upon to do and the nutritive material by which they are fed and sustained.

But there is another cause, or set of causes, that plays a part in this transposition of function, and which falls under the head of sexual selection. The male element in the community, and quite as often or oftener, the female, marries for wealth, position, influence; but never without taking into consideration the personal make-up of the other person. Blemishes of physique, or of mind, are always against the person; but not necessarily to the extent of his or her rejection. Except for the advantages named, a representative of either sex would not, other things being equal, pair with an actually, or even prospectively, toothless representative of the other sex, if the choice lay between teeth and toothlessness. A young girl without incisor teeth of some kind, is, from an æsthetic standpoint, unsightly, unattractive, and as such would be severely let alone by the marriageable and marrying young buck, provided he could find a toothsome and toothful young girl who could, in this and in all other respects, meet the requirements of his special case. The result in this instance would be a strain from ancestors possessing teeth, with reasonable hope of teeth in the offspring; while in the case of the said young buck and the toothless girl, the progeny would inherit from the parents a tendency to teeth modified by the further tendency to early loss. But our young girl without teeth, or with bad teeth, is equal to the emergency—is not to be left; and knowing some of the advantages of a good looking mouth, and how much sometimes depends upon its possession, she applies to us for that she has not, or for better than she has, carries out the deception, propagates her kind, and hastens the day of the extinction of those parts of the human

frame, repairs on which enable us to provide for ourselves and those dependent upon us the ever welcome bread and butter.

A recapitulation of what we have said leads to conclusions somewhat as follows: that mastication was, and with some grades of men is, the primary function of teeth; that ornament or personal adornment was a secondary function of human teeth; that in civilized communities this order is now reversed—ornament or personal adornment having become primary, mastication secondary; that this transposition of function is directly as the civilization; that the causes leading to the suppression of mastication are such as fall under the head of natural selection; that the causes leading to the advancement of a secondary function to the first place in the list of functions of the teeth are attributable, in the main to sexual selection, incidentally to the talent and genius of the dental profession.

DISCUSSION.

J. G. Ambler: I differ from the essayist; but the paper seems to cover the whole ground. I have nothing to add to or take from it.

Frank Abbott: I would take from it "from Bridget to belly."

O. E. Hill: Which would you leave?

Frank Abbott: I would leave "Bridget."



PREPARATION OF THE MOUTH FOR THE INSERTION OF TEETH OF SUBSTITUTION.

BY W. H. ATKINSON, M. D., D. D. S., NEW YORK.

The first requisition is to ascertain the impracticability of the preservation of the natural teeth.

When it is decided that one or more teeth in the mouth are beyond natural repair, it becomes necessary to ascertain the extent of the defect—that is to say whether the crown and root are so far deteriorated as to render it impossible to tolerate them, one or both.

In case the crown alone has to be given up, and the root capable of being rendered compatible, then it should be so prepared as to give the best support possible to an artificial crown.

In case the pulp be living, we have the opportunity to supply a really first-class substitute by the use of a banded crown. The mode of preparation of the root in this case consists in so trimming the neck of the root and stub of the crown as to afford as nearly as possible a cylindrical form of base upon which to adjust a perfectly fitting band so as firmly to retain the crown.

In case the pulp be dead, a very different procedure is demanded. And we now may resort to band alone as before, or band and pivot or screw into the canal by which to retain the substitute firmly in place.

In case we resort to band without pivot or screw, it will be necessary to so treat and fill the canal as to preclude the advent of subsequent alveolar abscess. This preparation will consist in taking out every vestige of dead and foreign substance from the entire length of the canal, and after disinfecting completely, hermetically sealing it, then proceed as in the first instance.

When it is deemed best to use the pivot or screw alone without any band, the root should be dealt with as before, with the exception of only filling the end of the root and so much as is intended to be above the pivot or screw. And then the base of the root should be so hollowed out as to afford a pocket around the pivot hole of such dimensions as to secure a good hold between crown and root by some tough and indestructible cement—gutta percha, oxy-chloride or oxy-phosphate of zinc or amalgam, as the operator selects.

Where both band and pivot are resorted to the procedure is so nearly the same as just detailed as to not demand repeating.

If band and screw be preferred the difference of manipulation will consist in following former directions in putting on the banded crown with cement and afterward sending the screw firmly into the already prepared hole in the root, being careful to cut it long enough to allow it to come fully through the cement within the band, thus affording a good finish. The cement may be finished off even with the end of the screw, or may be cut away and gold, tin or amalgam used to fill in the band around the screw up to its end or over it, as preferred, and thus secure a complete restoration of the natural contour.

Where roots are to be removed an impression should be taken and substitutes prepared before the extraction, so as to insert the substitutes immediately upon cessation of hemorrhage after extraction.

This is regarded as the only humane and artistic method, as it controls the extent of absorption and prevents the falling in of the lips, as invariably follows the old mode of removal and waiting for the healing of the gums and removal of the sockets.

The case where all the teeth and roots are so far gone as to demand removal are so rare as to render it unlikely that a well educated dentist at this day will be found to advise it.

But even in such a rare event the above commended methods of preparing the mouth for artificial substitutes still hold good.

The preparation of roots for sustaining partial or entire sets of substitutes differs in method according to the movable or immovable character of the pieces.

When they are not intended to be taken out for cleansing they will be permanently attached to the roots as before described.

Where they are to be taken out it will be necessary to securely insert sockets (of gold or platinum) in the roots into which to pass the pivots which have been soldered to the pieces, complete or partial, so as to hold them firmly in place.

These pivots may be solid wires or cylinders, and accurately adjusted to the cylinder sockets in the roots ; or they may be slit at the ends and sprung apart so as to be retained by the tension of the spring. The extreme points must be beveled to admit them when pressed together at the time of insertion.

The importance of the preservative of the roots in their sockets has not been adequately appreciated in the past history of artificial dentistry, even among the more learned and skillful in the practice.

The principal duty of the roots of the teeth is the reception and distribution of the force of the jaws in mastication, which is never even approached in its perfection by substitutes, which rest upon the gums as is inevitable where all the roots are gone.

To understand the changes which occur upon the removal of the roots of the teeth it is necessary to know the changes which take place in their development, nutrition and the absorption of the now no longer needed sockets in which they were held.

This knowledge involves study of food, blood, tissue and molecular metamorphoses by which it is effected.

The main obstacle in the way of study and teaching the changes of functioning bodies and processes, consists in the methods and classifications resorted to by those who are most earnest and persistent in the research. Individual and separate observation tends to one-sided and incomplete interpretation of fact and function, while investigations made in classes of compatible associates tend to breadth and clarity of view and interpretation of the facts and phenomena observed.

A perfect peptone is a completely elaborated pabulum capable of absorption by needy tissues without awakening any septic or retrogressive action in the territory where it may be introduced through the natural channels or by artificial injection.

The molusks used for food are so nearly reduced to peptones that they demand but little expense of digestory energy to fit them for assimilation by hungry tissue.

A fresh raw oyster is a good example of a nearly perfect peptone easily disposed of by even weak digestory apparatus. Hunter says "there is not a natural action in the body, whether voluntary or involuntary, that may not be influenced by the peculiar state of the mind at the time." This is evidence of the illumination under which he wrote, of which he was aware but unable to refer to its source, in his inspiration of the radiance impact which revealed it to his waiting consciousness.

He was a man of such crochety wilfulness that he implicitly followed his illumination and believed in it as his own genius without caring to stop to consider. This grew out of his solitary habit of investigation and unwillingness to admit others' observations as valid.

The domination of authority, then more than now, may be cited as extenuation of his absolutism, which had produced the "state of the mind at the time" to which he referred and of which he seemed unconscious in his personal experience, though so clearly perceiving it in others.

Food must be digested into blood, blood into pabulum, pabulum into protoplasm, protoplasm into embryonal corpuscles and these into tissues.

To show all this in a short paper to be read and discussed at a meeting where many other subjects are to be heard, is quite out of the range of possibility, even by one capable of doing such an herculean work.

But let us at least take a few steps in the direction of attempting this transcendently important foundation work. We may not live to see the building complete, yet we may lay some of the foundation stones upon which the magnificent temple is to stand as a beacon set upon a hill, whose light will disperse the darkness that has hitherto made empiricism rather than science a guide in practice.

Digestory and blood changes consist of metamorphoses in food, pabulum and protoplasm.

Let us begin with chyme, which is divisible into four distinct proximate principles: 1. Dispeptone (division of chyme by splitting up of its molecules). 2. Parapeptone (combining by sidewise laying of molecules). 3. Metapeptone (closer combination by getting between the molecules), and 4. Perfect peptone (in which the molecules get into such intimate relations as to admit of absorption by the needy tissues or passage into chyle, the absorption of which in the circulation keeps up the blood supply).

The changes which accompany absorption and intimate admixture of chyle with venous blood are not yet easily provable as separate and conjoined steps or stages of awaking and engagement of bonds of affinities, molecular and atomic, as they have been in those occurring in chyme producing the varieties of peptones.

When chyle is well diffused in the venous blood by running its course from the receptaculum chyli to the sub-clavian, vena cava and heart it is ready to be sent to the lungs, there to be brought within the sphere of influence of the vivifying oxygen to be acted upon and to act by its presence in the capillaries in the walls of the air vesicles where two degrees of blending of oxygen and blood take place.

One may be called oxygenation, the other oxidation; the first being a sort of sidewise laying of the molecules of oxygen about the red blood corpuscles, the other a completion of combustion of the partly burnt carbon in the venous blood.

This imperfect conversion of carbon lays the foundation for all inception of blood sepsis. The word vivification has not been sufficiently defined and limited to enable the beginner to utilize it in the legitimate sphere of its activity. Vivification is the making alive the bodies (called molecule, granule, corpuscle, tissue, organ and consciousness) in which functional activity takes place.

To comprehend the degrees of combinations and separations of the elements of functionary bodies, it is necessary to have a point of beginning for the movements, the modes and measures of which construct and operate these factors of function. This beginning point has been accepted and named atom. This is the unit, aggregations of which present us with material bodies.

The capability of being combined and separated is in the atom.

The *form* of combination taken on depends upon influx, the mode and degree of which constructs and limits the type or form of the body and the measure or sort of function it can operate.

Influx is radiations coming from the sun (where the sun gets it is a disputed point).

We may say Solar Radiance operates upon atomic mass, producing molecular mass, of which sensible or perceptible bodies are constructed. The first is an aggregation of molecules arresting the light so as to cast a shadow, which reveals the *granules*, &c. Construction and destruction then, of planetary bodies consists in putting on and taking off tensions of radiancy. The *embodiment* of these tensions constitutes consciousness.

So we see that "The All" is infinitesimally embodied in the least as well as in the largest functioning bodies. Furthermore, we have not yet arrived at actually accurate and lucid limitations and definitions of the finer steps of career. And we are often lead to nominate as primal or first, bodies and processes that are but sequences of indefinite lines of ancestral or causative antecedents. The individualities cognizable to us are not single and unitary, but very multiple and complicated in structure and character of bodily presence and activity. Even the body agreed to be put for first in the series, is by no means unitary in character, but at least binary if not ternary. It has a dynamic and static aspect, and some say a conscious aspect of personal presence. Whatever cannot be said of a primate in character and principle cannot be predicated of its aggregates.

Sepsis is evidence of imperfect digestory elaboration of chyme, peptones, chyle, blood and pabulum, as it is a retrogressive mode and irregular manner of molecular metamorphosis in the preparing of mass-food for the use of the elements of the body in which the functional changes occur, known as molecular, granular, corpuscular, organic, systemic and conscious changes.

Digestion is a sort of churning, skaking together of the food until it becomes, in some sort, a series of soups that have been named variously by different investigators, viz: Chyme (divisible into dys, para, meta, and perfect peptones), chyle and blood, which, by a retrogressive movement or back lash in molecular agitations becomes converted into pabulum, protoplasm and indifferent, or embryonal corpuscles, sometimes called mucous globules and animal-cells. These hold the values of the impacts of the energy which operates—breathing as the first example of impact of energy, the degrees and modes of which constitute the initial of every change molecular or massive, each body above acting as sun to that below it and each below acting as planet to that above it.

The accumulations and storing of this (to functional bodies) primal source of power, constitutes the measures of personal presence, potential and active, mental and corporeal, each involving the other in alternations of predominant and subdominant necessity !

When the radiancy (taken in and stored by breathing) is needed to perform any act of functioning body, the need awakens the tension of desire between the stored radiancy and the debilitated body, and thus the solar fullness flows into the planetary voidness satisfying the demand.

Where the channels of respiration are reduced in activity or in caliber, so as to minify the supply of air to the part, the stored energy takes the place of that which should have been received, thus supplying the functional power in the active tissues. This induces debility to the degree of disturbance of functional rythm and is manifested in spasmodic efforts to attain full supply of air or to eject the obstructions in the channels by retching, coughing, sneezing, &c.

This may occur in the minutest or in the most massive examples of respiratory, circulatory, innervatory, digestory or nutritive channels, disturbing the diamagnetic polarizations upon which functional changes depend in molecular, corpuscular, tissual, organic, systemic and conscious degrees.

Whenever these reductions of power or capacity (caliber) occur below the conscious degree they are said to be automatic and spontaneous and to control functional actions until they invade the plane of consciousness, where they may be recognized and in turn controlled.

The consciousness is awakened in the emotional, ideational, consensual, motor, excitator and voluntary degrees of automatism that turns the attention of the consciousness to the stored knowledge of the functions and factors of function in coinciding and opposing degrees, thus appearing as will, which has two modes. The first mode of stored knowledge is spontaneous or unconscious-consciousness, and involuntary, or sub-will. The second is the act of awakened purpose, or will proper.

I say "will proper" in deference to extant classifications which ignore the minor manifestations of *purposive energy* in the construction of molecules, granules, corpuscles, tissues and organs in a system in which it is said the consciousness *per se* has its seat, from which it sends forth behests in the form of will (volition). In the massive sense this is true. Works on physics and science limit all demonstrations to the crudity of differential sensuous perception and denounce as "unscientific" all attempts to deal with the primal realm of consciousness, which they use in their ratiocinative processes and instantly ignore.

Will is the RADIANT Autocrat in every realm wherever function of any sort is enacted, be it in pure consciousness or in any of its differential expressions. The great difficulty of comprehending and teaching Physiology, Pathology and Therapy lies right here. So long as we depend upon imperfect classifications of body and process, just so long will we be beating about in a succession of failures to arrive at certainty of origin, career and destiny of function and factor of function. This is proved to be yet our condition respecting *causation* of functional activities and the modifications of *disease*.

The two queries now agitating the minds of enquirers are, first, Are Micro-organisms the primal factors of function? Second, (or) Are they only factors in aberrant functional activity?

When sepsis occurs in molecular mass does it depend on impact from without its own territory, or is it an internal disturbance reducing some molecules to the atomic state? In either case it would be the result of impact from without, the only difference consisting in the openness and the occultness of the altered movement among the constituent elements of the mass.

The internal ability to respond being the conservation or storing of the energy of former impacts, by which the molecular-mass was produced. Ripeness of molecules fits them to respond to the demand of type in the granule which is the first example of visible functioning

body. In like manner of the ripening process, granules take on the type of corpuscles and corpuscles that of tissues, and tissues become wrought into organs and these collated into systems of organs, all operated by influx of typl energy by which RADIANCE holds dominion of the departments of functioning bodies.

The ripeness requisite for normal functional change in nutrition and that resulting in rottenness, disintegration, are both dependent upon degrees of satisfaction and dissatisfaction of bonds of combining affinities.

1. Satisfaction of tension is attained when the ripening process moves regularly in disruption and reconstruction of the molecules at the point of nascent condition whereby nutrition is perfected.

2. Dissatisfaction results upon minification of the influx of radiancy to the degree of failing to hold the elements of the tissues in due order of arrangement of corpusclar and granular tensions.

In the main micro-organisms have been regarded as iconoclastic in function, i. e., molecule breakers rather than molecule constructors. Hence the practice of classing them as pathological—disease producing bodies. Those who most strenuously claim that all disease is a result of micro-organisms fail to clearly discriminate and define what are to be catalogued as micro-organisms, capable of interfering with normal nutrient currents.

Micro-cocci are none other than granules, i. e., a mass of molecules dense enough to arrest the light pencil sufficiently to cast a shadow, under a high magnifying power of lenses, whereby it becomes cognizable to the sense of sight. From this initiative of observable activities we may progress with a tolerable degree of certainty as to the characteristics of corpuscles, tissues and their aggregations.

By rigidly keeping in mind the order of formation and metamorphoses in functioning bodies already noted we will be able to appreciate the necessity for room in space and open channels for breathing and feeding to enable type to accomplish its purposes in formation, nutrition, growth and activities of body and mind. If we desire to master the subject of decay, falling apart, we must first comprehend the construction—come-together—of the integers of the bodies we study. To do this in anything like a fullness of detail would far exceed the limits of a single paper. Permit then the attempt at a succinct summation of the integers of body and process in massive and minute manifestation.

Impact of light through ether becomes differentiated into four trinities of expression as follows :

1. Electrism. Magnetism. Chemism, heat.
2. Breath, Blood, Body.
3. Respiration, Circulation, Nutrition.
4. Feeding, Innervation, Mutation.

Embodiments of these twelve modes of light give their con-sens-ous in individual C. O. N. S. C. I. O. U. S. N. E. S. S. I, Me. The ego is the sum of minor egos through which all modes are separately and conjointly displayed in manner and degree of bodily and functional presence.

Each individual of simplest or most complex form must have sufficient space in which it is a plenum, of its kind, by which it has freedom to act out its natural desire to catch, hold and release the object desired by which it is formed, fed and worked in single, double, triple or multiple lines of tension, intension, contension and extension of plan and purpose of desire constituting career.

Prof. Summers says, "Functional activity is differentiation of integral elements." And Prof. Pepper says that "it is a remarkable fact that when an acid and alkaline solution are so placed that their union may be effected through the substance of an animal membrane, or, indeed, any porous diaphragm, a current of electricity is evolved.

Now, with the exception of the stomach and cæcum, the whole extent of the mucous membrane is, in the human subject, bathed in an alkaline mucous fluid and the external covering of the body, the skin, is as constantly exhaling and acid fluid. The mass of the animal frame is thus placed between the two great envelopes, the one alkaline and the other acid, meeting at the external outlets. This arrangement has been shown by Donne to be quite competent to the evolution of electricity. The purity and cleanliness then of these two modifiers of molecular combinations and separations, by which the diverse sources of organizing impact are brought into working relations, will give the measure and character of the work effected in them.

As these envelopes, skin and mucous membrane are the product of an arrangement of indifferent corpuscles, the study of this arrangement is the field in which to look for the initiative of perceptible function. And as these final outcomes of the epi-blast and hypo-blast constitute an electromagnetic battery, are we not nearing the seat of nutrient and de-nutrient changes? Infection, contagion, &c. &c

DISCUSSION.

C. S. Stockton: Under the kind resolution adopted this morning, that "any one from the United States, *or* New Jersey, be invited to participate in the discussions," I rise to say a few words:

I will digress for a moment to say that New Jersey is not the meanest State, that we should be left out of the Union altogether. It is true we have some mean people, but I must tell you two stories, and let you judge for yourselves who "takes the cake." A Jersey farmer started out one morning, and just as he was leaving home his wife said to him, "Take this egg, and tell the storekeeper to give you a darning needle for it." He made the exchange, but before leaving the store he said to the storekeeper, "You always treat when you make a trade?" The storekeeper said he could hardly do so on such a trade as this; but the farmer insisted, and the storekeeper treated. As the farmer was about to drink, he blandly smiled, and said an egg would be very good in this. The storekeeper picked up the egg he had just exchanged the darning needle for, and broke it into the whiskey. It contained a double yolk, when the farmer exclaimed, "Now, you must give me another darning needle. That was a pretty mean Jerseyman. But wait: A friend of mine—a distinguished Doctor of Divinity—lectured in one of the rural towns of New York, and had, as one of his hearers, a farmer, who realizing what power this divine exerted over his hearers, resolved that his son, too, should become a preacher or lawyer, and thus sway men's minds,—and so expressed himself to the Doctor after his lecture, and stated that he had been led to that decision that evening, and that he should ever hold the Doctor and the occasion in grateful remembrance. Time rolled on, the years were added to the great past, and the son became a man, graduated at college, and was now in the seminary studying divinity, with the hope of becoming a missionary. About this time the Doctor of Divinity again appeared in the town, this time pleading for funds for the support of the great missionary cause. When he had finished his address, the old farmer approached him and said, "I have remembered you all these years; to you is due

my determination to fit my son for his great calling ; and I now wish to show my appreciation of your great good to me," and my friend the divine says he gave him ten cents, and also says that man was so mean that he breathes through his nose, that he may save his false teeth. That man lives in New York.

But to come back to the subject of the paper just read, if that paper had the small-pox, none of us need fear taking the disease. It covers a good deal of ground, and a good many good things are said ; but I submit that we do not know much more about the preparation of the mouth for artificial dentures than we did before it was read. I am glad to know he recommends the taking of the cast of the mouth before the extraction of the teeth.

When you can save a good tooth, or roots that can be made healthy, by all means do so. There are too many teeth extracted. Get the roots healthy, and if you do not wish to crown them, put your artificial denture over them—especially so with the lower set. Many dentists remove everything in the way of teeth and roots, in order that they may have an easy job in putting up the new ones—it looks better, but it will not work so well. If I had nothing else to say for New Jersey, it would be this : "Keep every tooth and root in the mouth you can." That old Italian spoke words of gold when he said, "Don't let any dentist have a tooth." So say I. This sacrifice of the teeth is one of the greatest curses of our times. The forceps are sometimes necessary.

The good friend the doctor ran off on protoplasm and bioplasm until I feared, and it proved true, that "the preparation of the mouth for artificial dentures was entirely lost sight of in the maze of the "milky way and the Fourth of July corruscations."

M. L. Rhein: Without disparaging any of the admirable points of the paper, I would like to say a few words on one of the topics mentioned. That is, in regard to the preparation of the roots for crowning and inserting the crowns. We have heard a great deal about the use of a band, either alone or in combination. Now, *unquestionably* this can be inserted into a mouth so as to produce a beneficial result in many cases, but the point I want to bring before the Society is how very seldom it is done in the proper manner, and how often it is done in so bungling a style that, instead of it being a blessing, it is a positive injury to the patient. If I mistake not, proper mention was made of the fact that the beginning of the band *must* be a perfect continuation of the cementum of the root, and not raised a line above it. I have

seen a great many of these cases, but have seen very few where the operation was done in this manner. In the vast majority of cases the root is merely capped by the band, and its position in the mouth, often in the alveolar socket, is that of a foreign substance. What follows? Inflammation, hypertrophy of the tissues surrounding the socket, and very often pericementitis, and a host of evil things. I want especially to call your attention to the fact that if this kind of work is not done with the greatest amount of skill and perfection, it had far better never be done at all.

A Member: Describe the manner.

M. L. Rhein: The best method of preparing the roots is the Büttner method. According to his method a circular shoulder is turned on the neck of the root. He accomplishes this by means of a trephine which removes a certain amount of cementum and dentine from the root, leaving it cylindrical in shape. The ferrules are prepared to correspond in diameter and depth with the trephine, so that when forced in position they exactly replace the removed portion of tooth structure, and are not raised *one line* above the proper plane of the root.

THE INFLUENCE OF ANTISEPTICS, FILLING MATERIALS, ETC., UPON THE FUNGI OF DENTAL CARIES.

BY W. D. MILLER, D. D. S., BERLIN, GERMANY.

Having established upon an experimental and scientific basis the fact that caries of the teeth is, to a certain extent, the direct result of the action of ferment acid or acids* upon the tissue of the tooth, followed, particularly in the case of the dentine, by the action of the ferment organisms themselves upon the decalcified tissue, it becomes a matter of the first importance to determine, first, by what means we may counteract the action of the acids or prevent their production; second, by what means we may save the already decalcified dentine from complete destruction.

* The chief work in the production of caries is performed by lactic acid; other acids are only auxiliary factors.

Evidently there are three methods by which the desired end may be partially obtained :

1. By repeated, thorough, systematic cleansing of the oral cavity and the teeth, we may so far reduce the amount of fermentable substances in the mouth and the number of ferment organisms, as to materially diminish the production of acid. This is so self-evident that it needs no further comment.

2. By the repeated application of alkaline substances we may, to a certain extent, neutralize the acids before they have acted upon the teeth to any considerable degree.

3. By a proper and intelligent use of antiseptics we may destroy the organisms themselves, or at least render them inactive. It is this method which is especially applicable in the second stage of dental caries (*i. e.*, the stage which follows the decalcification), and to which we will here give exclusive attention. We must, however, constantly bear in mind that by whatever method we proceed, a previous thorough cleansing of the teeth is absolutely indispensable. There is no known solution, alkaline or antiseptic, applicable in the human mouth, which will penetrate between the teeth or to the bottom of fissures and cavities, when these are filled with food, in sufficient quantity to have any appreciable effect. Therefore, before all antiseptics or alkaline washes come the toothbrush, toothpick, and floss silk.

In my experiments for determining the action of various antiseptics upon the fungi of tooth caries, it appeared to me that by allowing the antiseptic to act upon the fungi in their natural medium, saliva, I could obtain results of more practical value than by experimenting upon them in artificial solutions, and in pure cultures, neither of which ever occurs in the human mouth. Furthermore, since the fungi can attack the teeth only after a partial decalcification, we have in the first place to demand of an antiseptic, not so much that it destroys the fungi, as that it prevents the production of acid by them.* Consequently, if an acid reaction failed to appear in a solution of saliva and sugar to which no antiseptic had been added, as soon as in a like solution to which no antiseptic had been added (control), it was taken as evidence of the activity and value of the antiseptic used. This method

*The production of acid may be taken as synonymous with the developments of the fungi, though the failure of the acid reaction to appear after a certain length of time does not necessarily indicate that the fungi have been *devitalized*.

could of course be used only with substances having a neutral reaction. The solutions were also subjected to a microscopic examination, to render the evidence doubly sure.

In the following table I have indicated the percentage of each antiseptic experimented upon which must be present in a sweetened-saliva solution, to prevent the appearance of an acid reaction in twenty-four hours, or in case of alkaline or acid antiseptics, to prevent the development of the characteristic fungi in the same time.

For example, if to 100,000 parts of sweetened saliva we add one part of bichloride of mercury, the solution will not be found acid after the lapse of twenty-four hours, even though the control became sour in four or five hours. If we add only one part to 500,000, the acid reaction will appear somewhat later than in the control.

This table is designed to show the comparative strength of the antiseptics most commonly used. The action of the antiseptics having an acid or alkaline reaction upon the fungi, was determined by the use of the microscope alone.

	PRODUCTION OF ACID (Development of Fungi)— PREVENTED. RETARDED.	
Bichloride of mercury.....	1-100,000	1-500,000
Nitrate of silver.....	1-50,000	1-100,000
Iodoform.....	1-5,000	1-10,000
Naphthaline.....	1-4,000 (?)	1-9,000
Iodine.....	1-6,000	1-15,000
Oil of mustard.....	1-2,000	1-5,000
Permanganate of potas.....	1-1,000	1-2,000
Eucalyptus oil.....	1-600	
Carbolic acid.....	1-500	1-1,000
Hydrochloric acid.....	1-500	1-1,000
Phenylic acid....	1-200	1-500
Liquid of Acid Cement.....	1-250	
Liquid of Excelsior Cement.....	1-225	
Lactic acid.....	1-125	1-250
Carbonate of sodium.....	1-100	1-200
Salicylic acid (Conc. alcohol sol.).....	1-75	1-125
Alcohol.....	1-10	1-20

The experiments show that bichloride of mercury is about two hundred times as powerful as carbolic acid, and demonstrate very clearly the mistake of substituting weak solutions of this antiseptic (1-1,000, as I have seen recommended) for concentrated carbolic acid. One

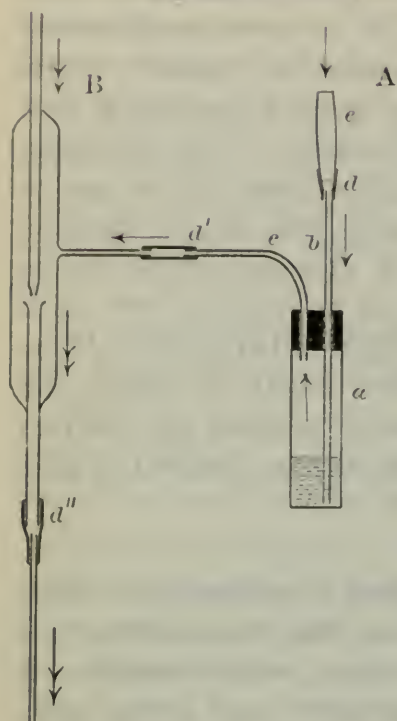
one-thousandth is only one-fifth as powerful as pure carbolic acid, which in many cases may be used with impunity. It is consequently useless to attempt to introduce the sublimate solution for the purpose of sterilizing root canals, cavities before filling, etc., unless we may use at least a one-half per cent., if not a one per cent. solution. I see no reason, however, why this may not be done. In a few cases I have used a one per cent. solution for treating root canals, and do not hesitate, particularly with the rubber dam adjusted, to wipe out cavities before filling with a two per cent. solution, and see no possible evil which could result from it. A well-known physiologist in Berlin has told me that he uses a one per cent. solution in his own mouth for aphthæ, and with excellent results. We should not, however, overlook the fact that a one per cent. sublimate solution is only one-fifth as powerful as pure iodoform.

As a mouth wash I have frequently used a one-tenth per cent. (1-1,000) solution myself, and have seen no bad results from it; I would not, however, recommend it to my patients in this strength. It has, besides, for me, an exceedingly disagreeable and lasting taste, which it is difficult to disguise, and produces an immediate increased secretion of saliva and mucous, which is very annoying. A one-fiftieth per cent. solution (1-5,000) may eventually be brought into use; in this concentration it is four times as powerful as a one per cent. solution of carbolic acid. The very high antiseptic power of nitrate of silver is particularly noteworthy. Why may it not be employed in place of the much more dangerous mercuric chloride?

The action of tobacco upon the fungi is worthy of notice. Five grammes of old Virginia plug were boiled fifteen minutes in fifty c. c. of water, the loss by evaporation being constantly replaced; the decoction was then filtered, and a portion added to an equal volume of saliva with sugar. This produced a mixture scarcely stronger than that which many veteran chewers carry around in their mouths all day, and in it the fungi led only a miserable existence.

Much more remarkable, however, was the action of tobacco smoke upon the fungi; the smoke from the first, third or last quarter of a Colorado Claro cigar being found amply sufficient to sterilize ten c. c. of a beef-extract-sugar solution, previously richly infected with caries fungi.

(Fig. one.)



a, Glass cylinder with infected solution.

b, c, Glass tubes.

d, d', d'', Rubber tubing.

e, Cigar (Colorado Claro.)

B, Water air-pump.

A current of water passing through B in the direction of the ↓ produces a partial vacuum in the bulb, and consequently a current of air in the direction of the ↓ or through the cigar, which if lighted will smoke at a rate determined by the pressure under which the water is flowing.

The apparatus used for this experiment (see figure one) explains itself. A current of water passing through the part B in the direction of the ↓ produces a current of air through the part A, in the direction of the ↓ which draws the smoke from a lighted cigar through the solution. The rate at which the cigar smokes may be regulated at will by the cock of the hydrant.

In consideration of the strong antiseptic power of tobacco smoke, we might be inclined to infer that tobacco smokers should never suffer from caries of the teeth; it is evident, however, that there are very many points in the dental arch to which the smoke never penetrates.

In the preparation of cavities for inserting fillings, it is naturally often next to impossible to remove all the carious dentine, and in all such cases it is especially desirable that the filling material itself should possess antiseptic properties, since we, in using such a material, not only destroy those organisms existing in the carious tissue, but the material, if it remains permanently antiseptic, retards the working of the ferment organisms from without, and the appearance of secondary decay. We need, therefore, a material for filling which is not only antiseptic at the time of insertion, but which remains permanently so after being inserted.

I have endeavored to determine the relative antiseptic power of different filling materials (cements, amalgams, etc.), not only at the moment of mixing, but after they were thoroughly dry, after they had lain some hours in sweetened saliva, and after they had been an indefinite time in the human mouth.

A large number of miniature test-tubes (homeopathic pill-tubes) were provided with cotton stoppers, and sterilized. Into each was brought one-half c. c. of beef-extract-sugar solution, previously infected with carious fungi (pure culture). To the first tube was added a small drop of a one per cent. sublimate solution; the second tube was left untouched, and into the third, fourth, fifth, etc., were brought the filling materials whose antiseptic virtues were to be tested; these were in the form of cylinders two m. m. in diameter, and three m. m. long; if old fillings from the mouth were used, pieces were taken having approximately the same size.

These tubes now being placed in the incubator, their contents became cloudy one after the other. In those tubes which contained fillings of but slight antiseptic power, the development of the fungi proceeded rapidly, and the cloudiness soon appeared. If, on the other hand, the filling was strongly antiseptic, the development of the fungi was hindered, and the cloudiness appeared later. The first tube to which the sublimate solution had been added of course remained clear, and by comparing the others with this it was easy to see just when the turbidity began to show itself; the second tube, containing no antiseptic and no filling, served as control, and the space that intervened after the control became turbid till any one of the other tubes became turbid, was a measure of the antiseptic power of the material in that tube.

As the result of a great number of experiments, I have been able to get together the following table:

When the control tube becomes turbid in 5 hours, then:

A tube containing an old oxy-phosphate filling becomes turbid in.....	5	hours.
“ “ “ oxy-chloride “ “ “ “	5	“
“ “ a gold cylinder becomes turbid in.....	5	“
“ “ a Hill's stopping cylinder becomes turbid in.....	5	“
“ “ an amalgam cylinder (kept 12 hours in saliva) becomes turbid in.....	5 $\frac{1}{2}$	“
“ “ an agate cylinder (kept 12 hours in saliva) becomes turbid in.....	5 $\frac{1}{2}$	“
“ “ an old amalgam filling becomes turbid in.....	5 $\frac{3}{10}$	“

A tube containing an amalgam cylinder (mixed dry) becomes turbid in...	5 $\frac{3}{4}$	hours.
" " an amalgam cylinder (mixed wet) becomes turbid in...	5 $\frac{1}{2}$	"
" " an oxy-phosphate cylinder (12 hours in saliva) becomes turbid in..	5 $\frac{1}{2}$	"
" " an amalgam cylinder (12 hours old) becomes turbid in	5 $\frac{3}{4}$	"
" " an old filling of tin and gold becomes turbid in.....	5 $\frac{1}{2}$	"
" " an oxy-phosphate cylinder (12 hours old) becomes.....	6	"
" " an agate cylinder (12 hours old) becomes turbid in....	6 $\frac{1}{2}$	"
" " an iodoform cement cylinder (12 hours in saliva) becomes turbid in.....	6 $\frac{2}{3}$	"
" " a pyrophosphate cylinder (mixed dry) becomes turbid in.....	7 $\frac{1}{2}$	"
" " a pyrophosphate cylinder (mixed wet) becomes turbid in.....	7 $\frac{3}{4}$	"
" " an oxy-chloride cylinder (12 hours old) becomes turbid in.....	9	"
" " a piece of dentine from a tooth impregnated by a copper amalgam filling becomes turbid in.....	11	"
" " an iodoform cement cylinder (12 hours old) becomes turbid in.....	12	"
" " an iodoform cement cylinder (fresh) becomes turbid in ?		"
" " a globule of mercury becomes turbid in.....	—	"
" " a cylinder of black oxide of mercury becomes turbid in—		"
" " a cylinder of any copper amalgam becomes turbid in—		"
" " any old copper amalgam filling becomes turbid in.	—	"
" " a cylinder of oxy-chloride (fresh) becomes turbid in...—		"

The (—) signifies that the solution remained permanently clear.

We see from these results that the only filling at present in use which exerts a continual anti-ferment* action upon the walls of the tooth and its immediate surroundings, is the old copper amalgam ; not only that, but the very substance of the tooth containing such a filling itself becomes antiseptic, a piece of bluish or bluish-green dentine from such a tooth very powerfully retarding the development of the fungi, and, indeed, in two cases completely destroying them. Secondary decay in such a case would be next to impossible, where anything like cleanliness was observed.

This result is well supported by observations which I have had abundant opportunity to make for the last five years, here where this material is so extensively used, and I do not hesitate to say that if our only object is to check the destruction of tissue by caries, there is no material at present in use with which this object may be so surely ac-

*I use the terms anti-ferment and anti-septic interchangeably, though the former is, perhaps, preferable, since we are treating of ferment, and not septic organisms.

complished as with a good copper amalgam. It is a material, however, which I have never used, though I am not aware of any bad effect produced by it beyond the discoloration of the tooth. Skogsberg's iodoform cement came into my hands too late to complete the experiments with it. It has undoubtedly strong antiseptic properties, which it does not completely lose even when exposed to the saliva, and might no doubt be used to great advantage as a foundation for permanent fillings. Old fillings of tin and gold possess slight antiseptic power, still less (almost zero) old amalgam fillings (not copper). The very inconsiderable power of amalgams to prevent the development of ferment fungi is a source of some surprise, since we have been accustomed to look upon them as very active in this respect. It is probably a mistake to attribute the hardening of dentine under amalgam fillings to the antiseptic action of the amalgam, since, in the first place, it possesses this power to but a slight degree, and in the second place the hardening may take place under fillings of gutta percha equally well. If we dry the cavity but indifferently well, and then choose a piece of gutta percha which we think will about fit the cavity, we of course can expect only bad results. If we proceed as follows we will obtain excellent results, as I have seen time and again: Adjust the dam, excavate carefully, especially the margins, wash with a strong antiseptic, dry thoroughly with bibulous paper and then with the hot-air syringe, till the surface of the dentine becomes whitish, paint with a thin solution of copal varnish, dry again with warm air, then put in the gutta percha in small pieces, one after the other, being *sure* that each piece sticks to its place, especially along the margin, just as if you were making a filling of gold. A piece which has once moved in its place must not be allowed to remain, as a leak will be the result. Remove such a filling after two years, and the cavity will often be found in an excellent condition for a gold filling.

The oxy-chlorides when first mixed, are powerfully antiseptic, but soon lose their energy when exposed to the action of saliva.

The oxy-phosphates are very much inferior to the oxy-chlorides in antiseptic power, and should never be used in cavities where there is much soft dentine. This conclusion is borne out by my own experience in practice, and by that of others with whom I have conversed on the subject. Dr. Paetsch first called my attention to the disastrous results of such a practice, and his testimony was confirmed by that of Dr. F. P. Abbott, and others.

It must not be expected that the results given in the above table are absolutely free from error. The experiment is attended with more difficulties than are at first sight apparent ; especially does the sterilization of the filling materials themselves involve much time and labor, and the results are not always constant ; this was especially the case with iodoform cement. Amalgams and phosphates gave quite constant results. The tests with some of the materials were made over twenty-five times ; with others, such as copper amalgams, where there was no doubt as to the result, only a few experiments were made.

• Caries of the teeth, except in the later or last stage, is the result of a ferment process, and the organisms found in the deeper parts of decaying dentine, which I have isolated and obtained in pure culture, are ferment organisms. The decomposition of the pulp and contents of the root canal, attended by bad-smelling products, is on the other hand, a putrefactive process, in which entirely different species of fungi are concerned. Whether or not the results which I have obtained for the fungi of caries would apply equally well to those putrefactive fungi, is a question which can be settled only by experiment upon pure cultures of the same.

Although I have now, as I think will be granted, established upon a sure basis a fact that caries of the teeth may result directly from the action of acid-producing fungi in the presence of fermentable carbohydrates, the conclusion would hardly be justifiable that, by keeping the mouth constantly and perfectly free from all fermentable substances, or by repeated application of antiacids or antiseptics to all parts of the teeth, or by all these means together, we could ever banish dental caries from the oral cavity. A most powerful influence, which we do not well understand, is exerted by the nutritive processes in the teeth themselves.

I am assured by men who have grown old in the practice of dentistry, that mouths which have long been under their observation, and which practically have been completely free from caries for years, at once, on account of some sudden change of health, show a general breaking down or crumbling of the teeth, *en masse*, in the space of a few weeks. It has also been my experience that patients who have been dismissed by their dentists in America, with the assurance that according to previous experience their dentures would require no treatment for one or two years, have come to me a few weeks later with teeth looking as though they had not been under the hands of a dent-

ist for years. Some say the ocean voyage spoiled their teeth ; others attribute it to a change in the climate, food, health, etc.

At any rate, we have here a cause which lies without the domain of both bacteria and acids (either ferment or otherwise). The lime-salts of the teeth are supposed to form, with the organic matter of the tooth, a definite chemical compound, and it is probably due to this fact that simple salts of lime are so much more readily soluble in weak acids than pulverized tooth-bone, or that the tartar upon the teeth is so much more easily soluble than the teeth themselves ; so that when any one rinses his mouth with vinegar, and afterwards finds lime in the vinegar, we know that the lime, in by far the greater part, if indeed, we may not say altogether, came from the tartar. Now, though there is no positive evidence for the supposition, it is certainly not altogether improbable that, as a consequence of certain derangements in the nutritive functions of the teeth resulting from a change of health, etc., etc., a dissolution of the affinity between the lime-salts and the organic matter may take place, thus setting free the easily soluble lime-salts, which are then carried away in solution or washed out mechanically.

This is a supposition only, which I bring forward because facts in this case are absolutely wanting. If it should, perchance, contain a trace of truth, then adult and pulpless teeth should be less subject to these *sudden* attacks of caries than young teeth with living pulps.

There still remains much hard work to be done, before the subject of dental caries may be dismissed as having received a final solution *in all its different phases*. There are men enough in the profession, however, who are willing to work, and who do not shrink from the tasks yet to be performed.

DISCUSSION.

W. C. Barrett: I suppose that you are all aware that Dr. Miller has been carrying on a series of experiments of the most extensive kind. The laboratories of some of the first histologists of Europe are open to him, and he has their advice and co-operation at all times. This paper is the final summing up of a series that he has written. He has conducted thousands and thousands of experiments, and almost worked himself into the grave, and for what? He wrote me, "I am, first and last, an American, although I live in a foreign country. I am not solicitous concerning my fame in Europe, but I do care for a reputation among those I love, and therefore the record of my labors

is given to American friends. When friends protest against my spending myself as I have, they do not recollect the anxiety that I have to obtain a place among my brethren at home, and to feel that I am not entirely unknown where most I desire to be known." (Applause.)

C. E. Francis: I think, Mr. President, that Dr. Miller in his paper refers to lactic acid as being one of the most powerful destructives.

W. C. Barrett: The acid generated by the fungi bears a striking resemblance to lactic acid.

C. E. Francis: It reminds me of a case in practice. A gentleman whose diet had been for a long time almost exclusively milk, came to my office for treatment. His teeth presented a very remarkable appearance, being almost destitute of enamel. The only thing I found myself able to do was to fill them with gutta percha.

Frank Abbott: This is really the most pleasing paper that I have ever read or heard read from Dr. Miller. It seems that notwithstanding the peculiar turn the discussion of this subject has taken, that he and Dr. Stockwell are in about the same position. They evidently see the same thing, and see it in the same way—that there is a germ behind, a thing that provides or produces the acid, which goes on and does a certain amount of a certain kind of work.

Now there is one position which I take, and they do not; but I think when they see these things as I do, they will come to the same conclusion. They start with the lime salts upon the surface of the tooth, and the next thing they come to is putrefaction in the interior of the tooth. They do not make any intermediate step; they start with the one and stop with the other. Where and what is this intermediate step? They talk about it, whether they claim it as fact or not. Now, I claim that there are certain steps in this process, and the moment you expose a portion of the tooth which is organic and has life in it, you produce an irritation, and that penetrates by the presence of fungi or the action of the acid. I have seen this a great many times myself. Does this reach the pulp-tissue, and then this putrefaction take place? I do not think it does till the tissue is dead.

C. T. Stockwell: There have been many occasions during my life when I would have given almost anything to be able to get upon my feet and say what I would like to say, but it is impossible. My position in regard to the putrefactive stage in caries seems to be very much misunderstood. I have never claimed that the putrefactive process

involves the *entire* process of dental caries, as Drs. Miller, Barrett, and others, seem to understand me. All I claim in regard to putrefaction is, that it marks one of the *stages* of the phenomenon of caries. The various stages of the destructive process which *lead up to* the putrefactive stage we, of course, recognize and admit. This misunderstanding arose, doubtless, from a misapprehension of a paper I read at Saratoga last August, wherein the endeavor was made to show that caries—*properly* so called—does not occur until the putrefactive stage of a greater or less portion of the *organic tissue* is reached. The discussion related simply to an exact *definition* of the term caries, rather than to the *process* of caries from first to last. A careful reading of that paper will, I think, make this point clear. I do not deny that acids play an important part in the phenomena commonly called caries, and I am strongly of the opinion that inflammation plays an important part also. Germs, inflammation and acids are, doubtless, all involved. My only claim is that micro-organisms are *primary*—that they are the “head-devils” in the fight—and that if they are excluded, no caries is possible. Hence, in our warfare against caries, our energies should be directed towards their destruction or exclusion. If a man attacks you with a gun, you may, of course, wrench from his hands the gun ; but if you overcome the energy *behind* the weapon—the man—the innocent gun becomes harmless. And so with our fight against caries ; by directing our efforts successfully against the various classes of micro-organisms, we reach the source, and prevent the action, of secondary agencies, namely, acids, inflammation, etc. In other words, if you exclude the organisms, you cannot have caries. This paper of Dr. Miller’s I regard as the “cap stone” of his series. It is the most practical of any I have seen. The significance of the paper is its recognition of the fact that micro organisms constitute the essential factor in caries. There is, therefore, no practical disagreement between us. We differ only in the more minor theories, of the details of the action of organisms upon the dental tissues. This Society is to be congratulated upon having such a paper read before it.

Wm. Jarvie, Jr.: This is an exceedingly interesting paper to me. I have listened as intelligently as I could to what was read ; but there is a point which is not perfectly clear to my mind, and perhaps some of the gentlemen can make it so.

I understand Dr. Miller’s theory is, that the first effect in the breaking down of the lime salts is that of acids ; that in his experiments he has found only fermentative organisms, and that further on we have putrefaction of the pulp.

Now we know that the enamel of the teeth must be broken down before putrefaction can occur, and that this breaking down occurs long before the pulp cavity is reached. What becomes of the matrix of the tooth if there is no putrefaction before the pulp cavity is reached? That is not clear to my mind, and I would like to understand it.

N. W. Kingsley: I have only one question to ask. Dr. Jarvie says Dr. Miller's statements put the acid action as first. Hasn't Dr. Miller clearly indicated that there is something back of that? disappearance of the nitrates? That is the theory I have always held, and recently I have been obliged to read up the history of dental surgery for an encyclopedia for which I am writing a paper. I have delayed that because I did not want to commit myself upon this point. Only recently have I written it, because it was obliged to go to the printer. I have said there, that all other things being equal, laying aside an inherent disposition to decay, the first step is the disappearance of the nitrates by the action of the acid upon the lime salts, which under those circumstances readily yield.

W. C. Barrett: Dr. Stockwell is of the opinion that there is very near harmony in the views held by Dr. Miller and himself. They are as wide apart as the east and the west. The difference is in the comprehension, or non-comprehension of the term ferment and putrify—fermentation and putrefaction. They have little in common. The bacteria that Dr. Miller speaks of are ferment organisms; the micro-organisms to which Dr. Stockwell alludes are putrefactive.

C. T. Stockwell: I do not know that I can express the theory which I have in regard to the process of caries, but as Dr. Barrett evidently does not understand me, I will attempt it.

We will suppose an *absolutely perfect* tooth, the enamel absolutely intact, and no defects whatever. The enamel, in such a case, forms a perfect protection against the micro-organisms. There are many places about the teeth, however, where food collects and remains undisturbed. Now the organisms of fermentation operate upon the food and the saliva, and the result is an acid. This acid may erode the enamel in time so that a portion of the organic tissue of the tooth becomes exposed; organisms may then act directly upon the fibrils or organic tissues; by absorbing the protoplasm they weaken its vitality or resisting force, disturb nutrition, set up inflammatory action, and the result is stasis and death of the organic tissue; after which the putrefactive and fermentative stage comes in, which disposes of both the

organic and inorganic portions of the tooth. We, then, *first*, have a *killing* of a portion of the organic tissue as a result of the action of organisms—a disease. Secondly, the disposal of the dead carcass—organic and inorganic—by putrefactive and fermentative processes—caries.

Now, in regard to the difference between putrefaction and fermentation which Dr. Barrett claims to exist: My theory is that the putrefactive process and the fermentative process may be simultaneously going on. The two *processes* are essentially identically alike. The result of one is alkali, accompanied by an odor—putrefaction; and the other process results in an acid, without the odor—fermentation. The processes are alike and have a common cause—organisms. Results differ in accordance with the substance operated upon. I cannot conceive how the organic tissue can be disposed of unless it be by putrefactive action, as Dr. Jarvie has suggested. There is in my opinion a plenty of work for the putrefactive organisms to do before the “pulp” is reached, and there can be no doubt at all that they are there ready to fulfill their mission.

DENTAL STUDENTS.

BY E. PARMLY BROWN, D. D. S., FLUSHING.

The proper early training of the dentist is certainly a very important thing to him; and whether he has been taught that which will be of immediate and lasting use to him, or that which will have to be unlearned before he can be of any use to himself or anybody else, certainly makes a vast difference.

Life is too short to have even a few years thrown away in making a mistake in this matter.

Many of the best men in the profession, those who would make the most thorough teachers, seem to have an aversion to taking students into their offices. Our late esteemed friend, Dr. Wm. H. Allen, remarked, a short time before his death, while at the office of the writer, seeing several students there, “I would not have a dental student in my office and around me, for thousands of dollars.” This remark, coupled with similar remarks made by Dr. J. W. Clowes, and other eminent men in the profession, and added to my own experience, has led me to

put the matter before you for your consideration and action, to see if the reasons for such a state of things can be comprehended, and then acted upon by the parent Dental Society of the State ; to help bring about a state of affairs so that worthy applicants may succeed in being taught in the private offices of those best able to render instruction, and that the best material may be furnished the able instructor, that the future of dentistry may be benefited thereby.

We may ask why so many dentists, who would make worthy preceptors, will not teach private pupils "for thousands of dollars," and we can easily see the man of wisdom is not opening his doors to the depredations that could be made upon his hard-earned practice, if he should happen, in the course of events, to receive into his sanctuary a black sheep, devoid of manhood, honor and gratitude.

Many of you are now saying to yourselves, "I know what you are talking about, I have been there myself," or, "my neighbor has been in that box, and the mischief was to pay." I have heard of my neighbors being in bad boxes for years, and I have viewed their pictures of Central Africa from afar off, and have been a little moved with pity, and a little moved with sympathy ; but not until I penetrated the jungles of that Central Africa myself, could I sympathize with them to a lively degree, or appreciate the discouraging situation.

I will draw a little picture from real life, pass a few remarks upon it, then make a motion before this Society, which I believe, in her wisdom and foresight, will be seconded and passed.

Let each one of you imagine a dentist in your State who may yet be yourself, who might have been yourself, settled with a well earned patronage in a small city or large village ; his ten or twenty years' practice has been hard knocks to get a foothold, always keeping his best foot foremost, trying to improve himself professionally in his education, and socially by his home and office surroundings ; and to the superficial observer prosperity has smiled upon him, and there are many seekers for his instructions, that they may also prosper. But prosperity has not smiled upon him as much as things do seem. She is only getting herself into position, so as to shine upon him, and do him some permanent good if he manages his affairs both wisely and well.

There are many shoals and rocks, and dangerous coasts that former unselfish mariners of our craft have pointed out—that others may not be stranded on them as they were—but there are many other dangerous spots to be marked by a lighthouse, a bell or a buoy ; and let us

see that our duty is not neglected, that we may prevent others, coming after us, from being wrecked. Our dentist has consented to help along some struggling youths, and lifting them one by one to their position in their profession, he still finds them come and go and prosper. He takes in one, two and three, sometimes more than he needs, and like the rest they all agree to pass on to new fields of labor and pastures green, and not to trespass upon the domains of their preceptor, who so kindly lifted them in the hour of their need into their position of advancement.

At last the student comes who has got his instructions and his diploma; but (to be charitable) forgotten his solemn obligations not to encroach upon the field of practice of his preceptor, but did not forget to ask his preceptor's permission to practice for a short time in the neighborhood to enable him to get his outfit, so that he could start in some other place selected.

The student settles down permanently, and the preceptor protests, but to no avail. The student prospers; he has learned the field by heart; he knows his preceptor's principles of practice, his prices, his precious patients, and his poor pays. Courts the precious things, and runs no risk with the "poor pays," that his preceptor has paid dearly to find out. Hands his cards and sends circulars to patients of his preceptor, and announces in every way that he is "cheaper."

A row is raised; truth, partially told, is made to be a lie; a lie, of cunning make, is shown up as the truth; bad blood engendered, many people help it on, and the Kilkenny cat experience may often result.

This is the heritage our fathers gave us in our profession, in regard to the relation existing between the preceptor and his pupil. It is for us to say whether we shall hand it down to our children, to torment them, or whether we shall in this, the Dental Society of the State of New York, take the initiative and see that a suitable form of contract, binding in the courts of this State, as between dental preceptor and pupil, is prepared and printed, to be obtained, upon payment of a certain sum, of the Secretary of this Society, when needed by dentists who wish to protect themselves in such cases, which amount paid for blank contracts, will reimburse the Society for any expense for printing, legal advice, etc.

And if it be found, upon investigation, that there is no form of contract which can be drawn between preceptor and pupil, in protecting

other preceptors, it can be the pleasure of this Society, at some future meeting, to see that a suitable law is passed for the purpose.

At the conclusion of the reading of the paper, Dr. Brown offered the following (for the discussion of which see page 32):

Resolved, That this Society appoint a committee of three, with power to draft a form of contract, to be approved by a competent legal advisor, and submitted to this Society at its next meeting for approval, which contract shall be binding in the courts of this State, by the signing before witnesses of said printed agreement, to prevent dental students from improperly interfering with the practice of their preceptors, copies of the same to be obtained of the Secretary of this Society, for the sum of one dollar each, which will reimburse the Society for expense of legal advice, printing, etc., said expense not to exceed the sum of thirty dollars.

ANATOMICAL REASONS FOR DENTO-ALVEOLAR ABSCESS OF THE HARD PALATE.

BY J. EDW. LINE, D. D. S., M. D. S., ROCHESTER.

By dento-alveolar abscess of the hard palate we mean abscess originating in, at or near a tooth, and having as its proximate cause diseased elements in that tooth, and this in contradistinction to alveolar abscess not traceable to nor dependent upon such elements—an affection, by the way, very rarely met with.

As a rule, no matter on which side of the roots of single-rooted teeth, nor which side of the buccal roots of double- or triple-rooted teeth an abscess may form, it is more than likely to open over the affected root, and on that side next the lip, or cheek, as the case may be. The same thing is true when an abscess forms on the innermost root of triple-rooted teeth, as the superior molars. The first bony tissue involved is that extremely spongy kind grasped by the roots. This is broken down, the pus burrows into that neighboring tissue offering the least resistance, passes between, and possibly under, the buccal roots, and finally perforates the extremely thin layer of compact bone forming the external plate of the jaw. But an abscess does at times form at or near the palatine root of the superior molars, and opens in the hard palate; or the pus may work its way to the junction of hard and soft palate, and show itself as a fistulous opening in this more plastic but rarely affected appendage. In a case like this an indifferent examina-

tion will reveal a squarely vaulted roof, an easily-compressed quantity of connective tissue filling unusually deep depressions in those parts corresponding to the point at which the alveolar process is built upon the jaw proper, and extending from behind forward the distance comprised between the posterior palatine foramina, which are usually on a line with the farther aspect of the third molar, and the second (sometimes the first) bicuspid. Anatomically these depressions, right and left, are known as the posterior palatine grooves, and are for the lodgment of the palatine glands and transmission of the posterior palatine vessels and descending palatine nerves, all of which lie close to the jaw, and are well covered and protected by the easily-compressed connective tissue just mentioned.

Now where we find such conformation as this, we experience no difficulty in arriving at a conclusion as to why an abscess should open on the palate, hard or soft, rather than on the buccal surface of the maxillary bone—namely, spongy bone in the vicinity of the root, a thin layer of compact tissue at the surface, and this layer, particularly in the young subject, perforated by innumerable minute openings for the transmission of equally minute vessels and nerves. Unquestionably the porosity that characterizes spongy bone, and the many foramina in the compact tissue, though filled with vessels and nerves, offer little resistance to the progress of burrowing pus.

But while abscesses of or in the hard and soft palate may be, and in some few cases are, traceable to the posterior teeth, and because of the condition of things by which they are surrounded, the great majority of abscesses of the region in question are traceable to the anterior teeth, and particularly the lateral incisors. Without exception the authorities agree that the lateral incisors are the guilty teeth; but the reasons for this behavior on their part are not only not even hinted at, but in effect confessed as past finding out. Tomes (*System of Dental Surgery*, '73, p. 486,) says: "For some reason not very apparent, abscess of the hard palate almost invariably proceeds from a lateral incisor." Salter (*Dental Pathology and Surgery*, '75, p. 240,) says: "Occasionally the matter, in alveolar abscesses, points at the posterior extremity of the hard palate, though the abscess has been occasioned by one of the front teeth, usually the upper lateral incisor. Why this should arise I cannot say: the pathological anatomy of the affection is essentially the same as in ordinary cases, only the canal of the abscess is lengthened out in the narrow cancellated bone between the two compact plates of the palatal process of the superior maxilla." Other

authors are agreed as to the causative tooth, and state the well known facts, but never offer a suggestion as to even a possible reason for their being so.

If we examine a human skull from the under side we will find back of and between the central incisors a depression, slight or great, pierced at the bottom by two, three or (in the symmetrical human skull) four holes. This depression is the anterior palatine fossa, and the holes the foramina which transmit the left and right naso-palatine nerves and the anterior palatine vessels. When the depth of this fossa is great, and the layer of bone between it and the central incisor thin, there seems to be greater reason for an abscess jointing on the palate than where it usually does—under the lip. And as a further inducement to pus to work that way, we have the inter-maxillary suture, the immediate tissue of which is neither spongy to a great degree, nor very compact—a cross between the two. And this leads to the observation that in the early history of alveolar abscess opening directly over the central incisor, the way from the fistulous opening to the root is not direct, but by way of the suture.

In a further examination of the skull in question, “a delicate linear suture may be seen extending from the anterior palatine fossa to the interval between the lateral incisor and the canine tooth. This marks out the inter-maxillary, or incisive bone, which in some animals exists permanently as a separate piece.” (Grey, '83, p. 188.) This suture is the dividing line between incisors and other teeth in the lower animals as well as man. A tooth found anterior to this line is in the incisive or pre-maxillary bone, and by its place of fixation, if for no other reasons, is known to be an incisor. This, to the comparative anatomist, important suture persists in most of the lower animals—Mammals, (sheep, porcupine), Birds (fowl for example), Reptiles (crocodile), Batrachians (frog), Fishes (perch); but in the well-developed adult man it is all but obliterated by the fusing together of the pre- and true-maxillaries. In the infant it is one of the noticeable features of the jaw, and may be traced without much difficulty in some subjects of twenty years or more. But where it persists in the human adult it is confined to the palatal aspect of the maxilla, while not a trace of separation is seen in the facial aspect. In fact, we have yet to see a human adult skull that shows this suture from the facial side.

Without further attempt at description of the parts involved, it will be seen that this suture between the pre- and true-maxillary bones fur-

nishes the chief anatomical reason for the appearance of dento-alveolar abscess in the palate, when the tooth concerned is a lateral incisor. An abscess forms at the root of a lateral (or it may be a canine, though more rarely), and meeting with less resistance on the side next this suture, breaks down the thin tissue, and the pus burrows, not in the direction of the facial wall, which is perfectly closed by compact tissue, but in the direction of the palate, obstructed in its course only by the thin layer of connective tissue filling the suture. It may continue its course to and through the inter-maxillary suture to the junction of the palate bones, or beyond, and then empty into the mouth; or before reaching the inter-maxillary suture it may turn off at a point almost directly back of the root of the canine tooth, follow the posterior palatine groove, and open opposite the palatine root of one of the molars, thus giving rise to the suspicion that the trouble originated close at hand, when in fact it was quite remote.

The conclusions, then, of this brief effort are, that abscesses of the hard palate are traceable to palatal roots of back teeth, or to the roots of the anterior teeth; that when the back teeth are involved, the roof of the mouth is squarely arched, and as a consequence the quantity of bony tissue between that covering the palatal processes and the root concerned (which is almost invariably the palatal) is extremely thin; that when the front teeth are involved, we may say of the central incisor that its nearness to the inter-maxillary suture, or to the anterior palatine fossa, or both, and the thin and spongy character of the bone separating them, accounts for the position of the abscess; or of the lateral incisor (and more rarely of the canine) that its close proximity to the suture separating the pre- and true-maxillary bones, the thin and spongy or porous character of the intervening bone, the perfectly fused and compact bone on the facial side, and the persistence of the incisive suture on the palatal side, furnish a state of things that account for the appearance of dento-alveolar abscess of or in the hard palate, and justifies the further conclusion that hidden things may often be brought to light if we but dig deep enough.

A CONDENSED HISTORY OF HISTOLOGICAL OBSERVATIONS.

BY FRANK ABBOTT, M. D., NEW YORK.

It was appreciated in a measure by Aristotle, who was born 384 years before Christ, that animals and plants, however complex their organization, are composed of a limited variety of elementary parts constantly recurring. It seems, however, to have been more clearly conceived by the father of medical science, Galen, who lived 400 years later. Aristotle distinguished as "*partes similes*" those structures, such as bone, cartilage, fat, flesh, blood, lymph, nerve, ligament, tendon, membrane, vessels, nails, hairs and skin, not confined to one part of the body, but distributed throughout it generally. He applied the term "*partes dissimiles*" to the regions of the head, neck and extremities. We are indebted to Fallopius of Modena, 1523 to 1562, for our knowledge of the conceptions of Galen, in regard to these "*partes similes*." These, however, do not correspond with the "elementary parts" or cells, of Schwann. Prof. Huxley says in his essay on "The Cell Theory," "they were ultimate to Fallopius because he could go no further, though it is, of course, a very different matter whether we are stopped by the imperfection of our instruments of analysis, as these older observers were, or by having really arrived at parts no longer analyzable." These "*partes similes*" really correspond to the "tissues" of the present day, which are collections of elementary parts. That the Egyptians knew something of the magnifying properties of lenses, as well as the Greeks and Romans, over 2,000 years ago, seems quite probable, from the fact that a table of refractive powers is introduced into his "Optics" by Ptolemy. Aristophanes, the Athenian poet (B. C. 500), speaks of "burning spheres" of glass as sold in the grocers' shops of Athens, and both Pliny and Seneca refer to lenses and their magnifying properties. Some of these lenses have been found in the ruins of Nineveh, Herculaneum and Pompeii. Compound microscopes, however, did not become available until about the year 1590, about which time Jansens. father and son, are said to have invented it. Fontana in 1646, writes that he had invented the microscope in 1618. Galileo, in 1612, is said to have sent a microscope to King Sigismund, of Poland; whether it was of his own invention or not cannot be determined. Whoever the original inventor may have been, it is certainly impossible to estimate the assistance this instru-

ment has been to succeeding generations in opening up the minute structure of animals and vegetables. Prof. Huxley says: "The influence of this mighty instrument of research upon histology can only be compared to that of the galvanic battery in the hands of Davy, upon chemistry. It has enabled *proximate* analysis to be *ultimate*."

The time prior to the invention of the compound microscope may be considered as the *first period* in *histology*; that between this date and that of the observations of Schleiden and Schwann (1838) the *second period*, and since that time the *third period*. Barellus, of Pisa, seems to have used the microscope in the examination of the structures of higher animals about the year 1656.

According to Boerhaave, Swammerdam had recognized the blood-corpuscles in the frog in 1658. Malpighi, between 1661 and 1665, had seen the blood-corpuscles in the hedge-hog, had witnessed the circulation of the blood, and had published observations upon the minute structure of the lungs—which he compared to a racemose gland,—of the kidneys, spleen, liver and membranes of the brain.

In 1757 Haller made the first intelligent attempt at building up the tissues by an ultimate physical element, to correspond with the "atom" of the inorganic chemist. "He resolved the solid parts of animals and vegetables into the 'fibre,' and an 'organized concrete.' To the former he assigns the most important position, asserting that it is to the physiologist what the line is to the geometrician; that a 'fibre' in general may be considered as resembling a line made up of points having moderate breadth, or rather as a slender cylinder." In 1759 to 1774 Wolff promulgated a theory, given as follows by Prof. Huxley: "Every organ is composed at first of a mass of clear viscous, *nutritive fluid*, which possesses no organization of any kind, but is at most composed of globules. In this semifluid mass cavities are now developed: these, if they remain rounded or polygonal, become the subsequent cells, if they elongate, the vessels; and the process is identically the same, whether it is examined in the vegetating point of the plant. or in the young budding organs of an animal. Both cells and vessels may subsequently be thickened by deposits from the 'solidescible' nutritive fluid. In the plant the cells at first communicate, but subsequently become separated from each other; in the animal, they always remain in communication. In each case they are mere cavities and not independent entities; organization is not affected by them, but they are the visible results of the action of the organizing power inherent in the living mass, or what Wolff calls the 'vis essentialis.' Two points are

here particularly to be observed, as cardinal,—first, the non-independence of cells, either anatomically or physiologically; that they are effects, *passive results*, and *not* causes of a vitalizing or organizing force; second, that organization takes place from the ‘differentiation’ of the homogeneous living mass in these parts through the agency of the ‘vis essentialis’ or inherent vital force.”

Among the first to express himself clearly upon the cellular or vesicular composition of animal organisms, as well as vegetables, was Oken, who, in 1805, in his work on “Generation,” speaks of elementary parts as “vesicles,” and who says, “The first transition of the inorganic to the organic is the conversion into vesicle which I in my theory of generation have called ‘infusorium.’ Animals and plants are throughout nothing else than manifoldly divided or repeating vesicles.”

In opposition to the “fibre” theory, then so prevalent among histologists, the “globular” theory was advanced in 1779. It is true that Leuwenhock, as early as 1687, announced the “*globular*” structure of the primitive tissues of the body, but this theory attracted very little attention until this period of reaction against the “fibre,” when it claimed the attention of Prochaska (1779), Fontana (1778), the brothers Wenzel (1812), Treviranus (1816), Bauer (1818 and 1823), Heusinger (1822), MM. Provost and Dumas, and Milne-Edwards (1823), Hodgkin (1829), Baumgartner (1830 to 1842), Frederick Arnold (1836), Dutrochet (1837), Raspail (1839); all except Hodgkin admitting, in greater or less degree, the importance of the globule as an ultimate physical element. It seems at the same time that no little confusion existed in the use of terms, the words *globule*, *granule* and *molecule*, being often indiscriminately used.

It should here be mentioned that in 1828, Dollinger announced that the tissues of the body are built up of blood-corpuscles, which move in wall-less channels in these tissues.

It would seem from the foregoing facts very evident that for some years previous to 1838, the cell had been recognized as a constantly recurring element in vegetable and animal tissues, though little importance had been attached to it as an element of organization. Raspail tells us in 1837, that in the condition of development, there are vesicles or cells endowed with life and the property of reproducing out of themselves other cells of the same structure and endowments.

Previous to this, however, a most important discovery was made, viz., the “nucleus,” by Dr. Robert Brown, of Edinburgh, 1833. He failed,

however, to appreciate its importance, though its discovery was another fact added to those necessary to complete the data on which has been founded the so-called "cell theory."

The pre-existence of the nucleus, and the gradual development of the cell about it, Valentin attempted to demonstrate in the case of pigment cells, C. H. Schultz in the blood-corpuscles, Rudolph Wagner in the egg, and Henle in epithelium, all before the works of Schleiden had appeared. Valentin too, had said, when describing the nucleus of epidermic cells, which he first pointed out, that they reminded him of the nucleus of the cells of vegetable tissues. Dr. Waldo J. Burnett states Valentin "perceived the true physiological relations of cells as far as he well could without apprehending the grand fact that the nucleated cell is the fundamental expression of organic forms."

In the year 1838, Schleiden pointed out the formation of cells in vegetable structures, according to a single and uniform method, and elaborated the theory of development of which the cell was the unit, and which Schwann immediately applied to animal tissues. One obstacle, however, presented itself in the way of a law of development, applicable alike to animal and vegetable tissues, namely, that animal tissues are furnished with vessels, in which respect they essentially differ from plants; an independent vitality being ascribed to the elementary particles of vegetables growing without vessels. This obstacle had, however, been in a measure removed, in 1837, by Henle, who showed that an actual growth of the elementary parts of epithelium took place without vessels. Taking up the nucleus as discovered by Dr. Robert Brown, Schleiden in referring to its function, gives it the name of "*cytoblast*." I will not weary you with the conclusions which he arrived at, as to the formation of cells, their reproduction, etc., etc., but will refer you to Tysons "*Cell Doctrine*," from which much of this paper is quoted.

The merit of Schwann consisted in applying the theory of Schleiden to animal tissues. Thus, in a "*cytoblastema*" (cell contents), either structureless or minutely granulous, "a nucleolus is first formed; around this a stratum of substance is deposited, usually minutely granulous, but not at first sharply defined on the outside. As new molecules are constantly being deposited in this stratum between those already present, and as this takes place within a precise distance of the nucleolus only, the stratum becomes defined externally, and a cell nucleus, having a more or less sharp contour is formed. The nucleus grows, by a continuous deposition of new molecules between those already existing,

that is by intussusception. If this go on equally throughout the entire thickness of the stratum, the nucleus may remain solid; but if it go on more vigorously in the external part, the latter will become more dense, and may become hardened into a membrane, and such are the hollow nuclei. At a certain stage of development of the nucleus, the cell is formed around it, to wit, a stratum of substance, which differs from the cytoblastema, is deposited upon the exterior of the nucleus. In the first instance this stratum is not sharply defined externally, but becomes so in consequence of the progressive deposition of new molecules. The deposition of new molecules between those already existing proceeds, and is so effected, that when the stratum is thin the entire layer, and when it is thick only the external portion, becomes gradually consolidated into a membrane."

"Immediately that the cell membrane has become consolidated its expansion proceeds as the result of the progressive reception of new molecules between the existing ones; that is to say, by virtue of a growth by intussusception, while at the same time it becomes separated from the cell nucleus. The interspace between the cell membrane and the cell nucleus is at the same time filled with fluid, and this constitutes the *cell contents*. During this expansion the nucleus remains attached to a spot on the internal surface of the cell membrane." In this manner, according to Schwann, the animal cell is formed. He believed that the cell-wall was the most active constituent of the cell, that it possessed the power not only of producing physical and chemical changes in its own substance and the cell contents, but of secreting materials from the surrounding substance, and depositing them in its interior; thus it was that glands secreted, and fat was formed in some cells, pigment in others, etc., etc.

From 1840 to 1846 Henle, Bergman, Reichert, and others, published the results of observations, but their conclusions were so nearly in accordance with those of Schwann that it would be too much of a repetition here.

In the same year, 1840, Martin Barry made some interesting observations, in the publication of which he states "that the germinal vesicle (the nucleus) and its contents constitute throughout the animal kingdom, the most primitive portion of the ovum," that the germinal vesicle returns to the centre of the cell, etc. Again he says, "the germinal vesicle fills with cells, and these become filled with the foundation of other cells, so that the germinal vesicle is gradually rendered opaque."

In 1845, Prof. John Goodsir published his paper on "Centres of Nutrition," in which he clearly grasped the two important principles of the modern Cellular Pathology; first, the activity of these centres (nuclei), their power to draw from the capillary vessels, or from other sources, the materials of nutrition, and to distribute them by development to each organ or texture after its kind; second, the origin of such centres, or nuclei, from previously existing nuclei. "From this it follows, not only that the entire organism, as has been stated by the authors of the cellular theory, consists of simple or developed cells, each having a peculiar independent vitality, but that there is in addition a division of the whole into departments, each containing a certain number of developed cells, all of which hold certain relations to one central or capital cell, around which they are grouped. Again, a nutritive centre, anatomically considered, is merely a cell, the nucleus of which is the permanent source of successive broods of young cells, which from time to time fill the cavity of their parent, pass off in certain directions and under various forms according to the texture or organ of which their parent forms a part."

In 1853 to 1855 the observations of Remak were published. They consist mostly, however, of a discussion of the manner in which new cells are formed. We have already alluded to Prof. Huxley in connection with Wolff. We find, however, in the same paper (1853) some views of his own which in this connection are worth considering, to wit., "Vitality the faculty, that is, of exhibiting definite cycles of change in form and composition, is a property inherent in certain kinds of matter. There is a condition of all kinds of living matter in which it is an *amorphous germ*—that is, in which its external form depends merely on ordinary physical laws, and in which it possesses no internal structure." He termed the cell nucleus the "endoplast," and the cell wall the "periplast," which of necessity implies a vesicle with a "central particle." That there is no "evidence that any attraction or other influence is exercised by the one over the other," the changes which each subsequently undergoes though they are in harmony, having no casual connection with one another. "We have therefore maintained the broad doctrine established by Wolff, that the vital phenomena are not necessarily preceded by organization, nor are in any way the result or effect of formed parts, but that the faculty of manifesting them resides in the matter of which living bodies are composed, as such; or to use the language of the day, that the vital forces are molecular forces."

In J. Huges Bennett's (1855) "Practice of Medicine," he says: The

ultimate parts of organization are not cells nor nuclei, but the minute molecule from which these are formed. They possess independent physical and vital properties which enable them to unite and arrange themselves so as to produce higher forms. Among these are nuclei, cells, fibres, and membranes, all of which may be produced directly from molecules. Prof. Bennett believed in the spontaneous origin of animal life, which position he openly advocated.

In 1856 Todd and Bowman published the results of their researches, but the conclusions arrived at were in no essential features different from some of those previously given.

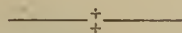
About two years later (1858) Virchow published his "Cellular Pathology." According to him the cell is the only possible starting-point for all biological doctrines. The cell can only originate from a previously existing cell, taking its primary origin from the ovum. The typical cell as described by him consists essentially of "cell wall," "cell contents" and "nucleus." The *nucleolus* he did not consider an essential constituent of the cell. The object of the "nucleus" he considered as entirely connected with the *life* of the cell, that which maintains it as an element, and from which other cells were produced. While to the cell contents, aside from the nucleus, is due the function of the cell, that to which is due the contractility of muscle, the neurility and sensation of nerve, and the secretory offices of the gland cell.

Dujardin had, in 1835, discovered in the lower animals a living, moving, contractile substance which he called "*Sarcode*." The peculiar appearances of this substance attracted the attention of many observers. It was thought peculiar to the lower animals, and there was assigned to it a property of "irritability without nerves." The discovery which, however, followed, of similar movements and changes in form, in colorless blood-corpuscles, pigment cells and elsewhere, led Kölliker to express the conjecture, that the contents of all cells are contractile.

In 1858, Max Schultze first showed the analogy between "*Sarcode*" and the contents of the animal cell, and that the entire infusorial world, simple or compound, is made up of cells, which he defined as "*protoplasm* surrounding a nucleus." "The cell leads in itself an independent life, of which the protoplasm is especially the seat, although to the nucleus also undoubtedly falls a most important, though not yet precisely determined, role. Protoplasm is for the most part no further distinct than that it will not commingle with the surrounding medium, and in the peculiarity that with the nucleus it forms a unit."

DESCRIPTION OF FIGURES

IN PLATES A TO E.



- FIG. 1. Naked Protoplasm of Slime Mould.
- " 1a. Diagram illustrating Change of Form.
- " 2. Protococcus showing Cilia.
- " 3. Pollen of *Cihicorium Intybus*.
- " 4. Pollen of *Lavatera Trimestris*.
- " 5. Dividing Cells of Growing Stem of *Vicia Faba*.
- " 6. Cross Section of Leaf, showing Chlorophyll Grains in Cells.
- " 7. Filaments of *Spirogyra*.
- " 8. Filaments of *Nostoc* and *Oscillatoria*.
- " 9. Starch Grains in Cells of Cotyledons of Peas.
- " 10. Smaller Grains of Aleurone in same.
- " 11. Crystals of Calcium Oxalate in portion of Cell of *Wilwitschia*.
- " 12. Vacuoles and Strings of Protoplasm in Cell of Plant Hair.
- " 13. Spicular Cells in Stem of *Nuphar Advena*.
- " 14. Unicellular Plants in Process of Division.
- " 15. Protococcus.
- " 16. Filament of *Oscillatoria*.
- " 17. Filament of *Nostoc*.
- " 18. Tip of Young Root of Indian Corn.
- " 19. Longitudinal Section of Root-stock of Fern, showing Parenchyma and other Tissues.
- " 20. Collenchyma from Stem of *Begonia*.
- " 21. Cross Section of Root-stalk of *Selaginella*, showing Sclerenchyma near the Surface.
- " 22. Wood Cells.
- " 23. Lactiferous Tissue.
- " 24. Spiral Vessel.
- " 25. Pitted Vessel.
- " 26. Reticulated Vessel.
- " 27. Scalariform Vessel.
- " 28. Annular Vessel.
- " 29. Stomata.
- " 30. Plant Hairs of Squash.
- " 31. Cross Section of Exogenous Stem.
- " 32. Cross Section of Endogenous Stem.
- " 33. Cross Section of Fibro-vascular Bundle of Stem of Sweet Flag.

NOTE.—Some of the sketches from which the plates were made, were enlarged from cuts in various botanical works—Sachs, Bessey, Bentley, McAlpine, &c.—and some were drawn from nature.

PLATE A.

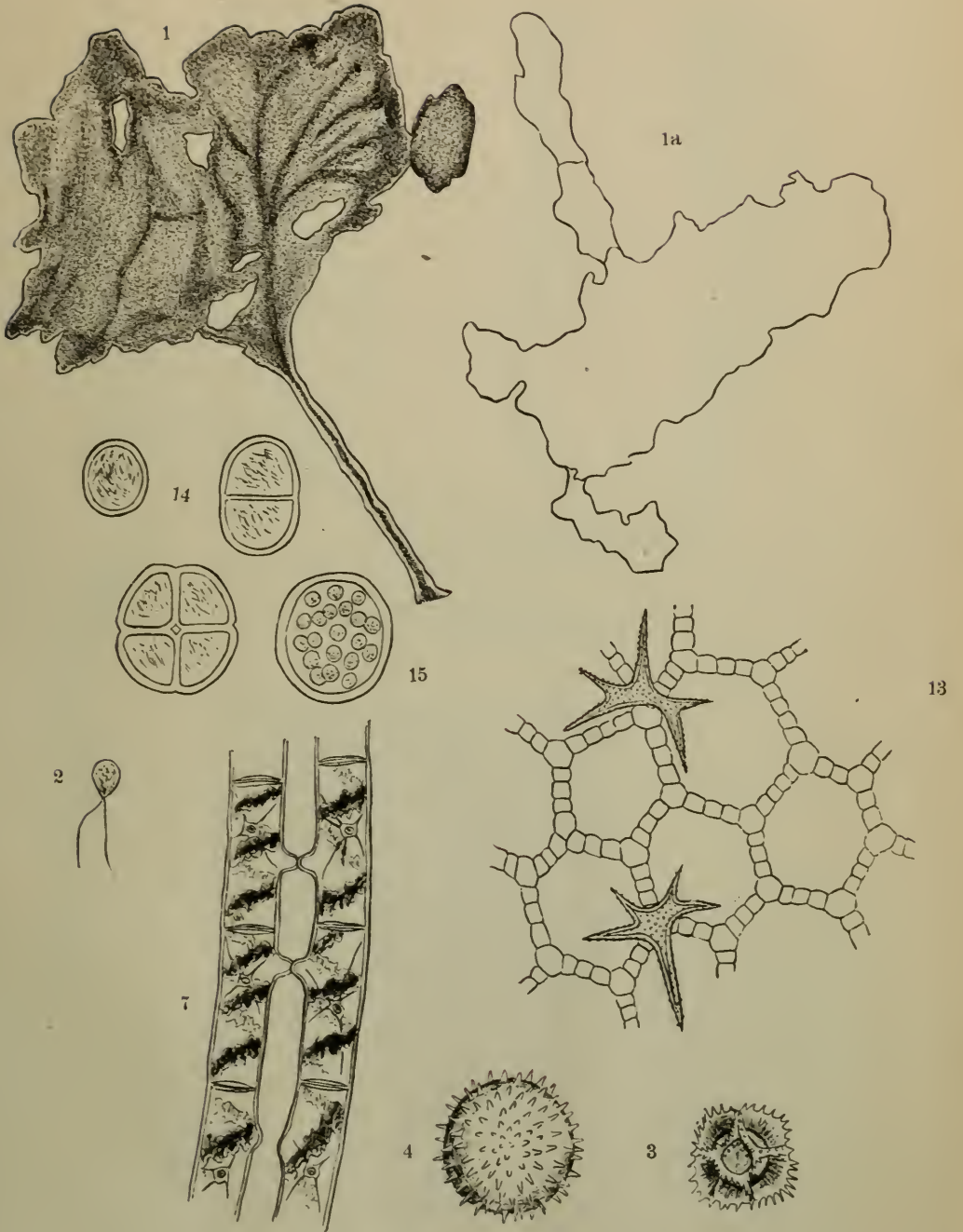


PLATE B.

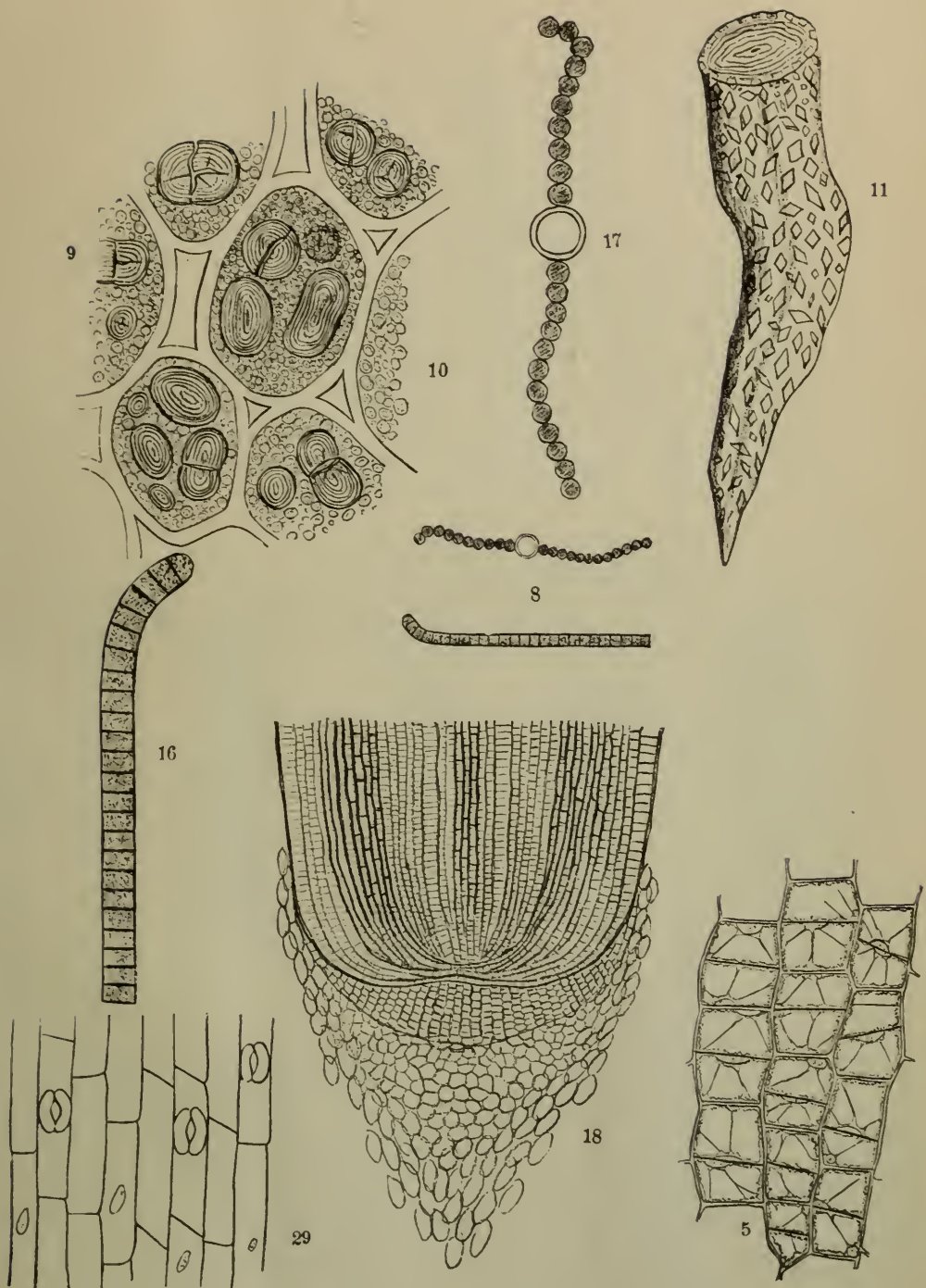
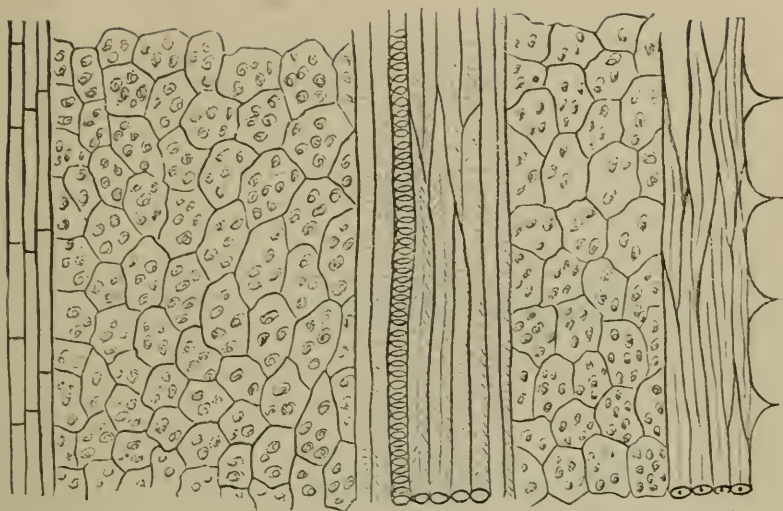


PLATE C.

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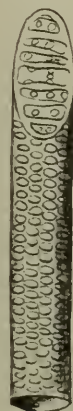
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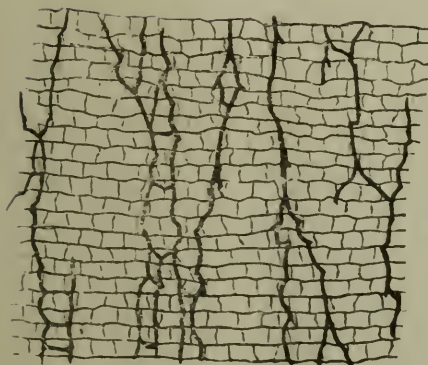
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OUTLINE OF VEGETABLE HISTOLOGY.

BY MRS. WM. STREETER, ROCHESTER, N. Y.

[Read before the Rochester Academy of Science.]

“To him who in the love of Nature holds
Communion with her *visible* forms, she speaks
A various language;”

but her story is not half told, even to her most ardent lover, till, aided by the microscope, he has communed with her otherwise *invisible* forms.

Histology, which is the microscopic study of the formation and growth of organic structures, has, during the last half century, revealed much that was not dreamed of either in the philosophy or science of preceding generations. If we examine with a microscope a thin slice of any portion of vegetable substance, we shall find that it is not homogeneous, but is made up of minute parts which are called cells. These

cells are to the plant what the bricks are to the edifice, but with this difference: the cell carries in its own bosom the cause of its own formation and growth, and the development of the whole structure. I do not now refer to the "Great First Cause"—Histology does not invade the realm either of theology or of philosophy. I refer to the living substance called protoplasm, "which, from its capacity of secreting substances of different chemical and physical properties according to definite laws, as well as its capacity of assuming varying definite external forms, is the immediate cause of cell-formation and every process of organic life."

Protoplasm, as found in growing plants, is a soft, inelastic, tough, albuminous substance. It was discovered by Von Mohl in the year 1846, and is said to contain oxygen, hydrogen, carbon and nitrogen, though its exact chemical composition has not yet been determined. All admit that it is similar to the living principle of animal substance. There are no physical or chemical tests by which the two can be distinguished. It was formerly thought to be a very easy matter to draw the line between plants and animals. This task has grown more difficult year by year until unprejudiced minds can no longer resist the conviction that man and moner. oak and alga, should recognize in *protoplasm* a lowly ancestor.

The old idea of a vegetable cell is of a little sack made first and afterwards filled, but observation has proven that the cell wall is but a secretion of the protoplasm it surrounds, and that protoplasm may, and often does, exist without any cell wall at all, as in the growing stage of *Myxomycetes* (Slime mould). (Plate A, Figs. 1 and 1^a). We must bear in mind, then, while we contemplate its variously shaped enclosures, that the plant cell proper is a little lump of protoplasm often less than a thousandth of an inch in diameter, but endowed with wonderful powers. It has been the custom to speak of it as structureless, but Dr. Gray says it is premature to call it so, and Prof. Schmitz affirms that there is a net-work in protoplasm, the meshes of which are occupied by a homogeneous fluid. He says the network readily stains with hematoxylin, while the fluid remains colorless. Those who are straining their eyes to behold the reticulated structure of the white blood corpuscle may strengthen their perseverance with such assurances.

One striking feature of protoplasm is its physical activity. In the *Myxomycetes* its movements may be readily studied as it streams in this or that direction. Having in its growing stage no cell wall to

restrain it, the outline is constantly changing, as in the *Protamoeba*. (So great a similarity exists between these organisms that Prof. Bessey quite reasonably suggests that "in *Myxomycetes* we have the *terrestrial* phase, and in the *Monera* the *aquatic* phase of the same group of organisms.")

A similar motion may be observed in the leaves of some aquatic plants, notably the *valisneria*, and in the appendages of some epidermal tissues. In the "motile stage," as it is called, of *Protococcus*, the green unicellular plant so common on flower pots, on damp earth, and in stagnant water, the protoplasm of the cell throws out slender arms called cilia, and by means of these the plant is whirled along with great rapidity. (Plate A, Fig. 2.)

Those familiar unicellular plants, the *Diatoms*, move with a slow and steady movement. The means by which they are propelled have not been observed, but the movement must be protoplasmic. A filament of *Oscillatoria* (Plate B, Fig. 16) will be carried out of the field of the microscope in a short time by the slow swaying induced by its active protoplasm; and to the same cause must be referred all those curious and seemingly intelligent movements observed in climbing plants.

In all but the lowest plants the protoplasm of every cell sooner or later surrounds itself with a wall of cellulose. On its first appearance the cell wall is very thin, but it thickens with age, and develops under varying circumstances a great variety of phases. The surface of many pollen grains illustrate to what an extent this development may be carried. (Plate A, Figs. 3, 4.) A weak solution of iodine applied to pollen grains, or any cells containing protoplasm, stains the protoplasm yellow, but leaves the transparent cellulose coat uncolored. The wood of exogenous trees consists of cellulose walls, from which, their growth being completed, the protoplasm has withdrawn to carry on its work elsewhere.

But we must notice protoplasm in its relation to other substances which are found in the composition of plants. In all but the lowest organisms there lies imbedded in the protoplasm a roundish, slightly differentiated body called the *nucleus*. (Plate B, Fig. 5.) It is to be hoped that our knowledge will yet include a definite idea of its exact function. I like to fancy that it is the private office of the builder.

The majority of vegetable tissues appear green. This is owing to another differentiation of the substance of protoplasm, by which

portions of it become separated in a definite form, and assume a green color, forming *chlorophyll bodies*, which, like the nucleus, not only arise out of the protoplasm, but always remain portions of the protoplasm mass. The green coloring matter called chlorophyll may be dissolved out of the chlorophyll bodies, leaving the remaining part apparently no different from ordinary protoplasm. It is the office of the chlorophyll bodies to assimilate the crude food materials of the plant. In the higher plants the chlorophyll is generally granular in form; in the lower it is sometimes uniformly distributed (Plate E, Fig. 6). In *Spirogyra*, a genus of filamentous algæ, the chlorophyll is arranged in spiral bands (Plate A, Fig. 7). Protoplasm and chlorophyll are sometimes designated as *primary* cell contents, as distinguished from numerous other substances called secondary cell-contents. In seeds, tubers, bulbs and roots containing reserve material, *starch* is almost always to be found. Its presence may be quickly demonstrated by the application of a solution of iodine. This re-agent, which colors protoplasm yellow, when applied to starch turns it immediately purple or blue, the iodide of starch being formed. Starch is found in the form of granules of various sizes. These granules, when sufficiently magnified, appear to have a nucleus and many concentric rings (Plate B, Fig. 9). This appearance is owing to the fact that starch is insoluble in water, and, as the grain is formed, some parts are more watery than others. The parts that contain more water appear lighter colored, while the denser portions appear darker. Starch is composed of two substances, chemically the same, though differing in their solubility. They are granulose, and starch cellulose. It is from the granulose that the iodide of starch is formed. Starch is secreted by the protoplasm in the chlorophyll-bearing parts of plants, and is carried from thence to the parts where it is needed. Starch which the cells of roots and seeds contain is used up in the growth of the structures which these give rise to.

The albuminous matter called *aleurone* is also found chiefly in seeds and tubers. It is especially abundant in seeds which contain oil, as the almond, the Brazil-nut, and the castor oil bean. It may be easily studied also in the cotyledons of the common pea (Plate B, Fig. 10). It occurs in the form of small rounded grains, which yield the reactions of protoplasm. It is soluble in water, but insoluble in alcohol, oil, or benzine. The grains frequently contain other bodies enclosed in their substance, which are crystal-like in form, but which are proven to be albuminous in their nature, as they absorb water and color yellow like

protoplasm. These bodies are called *crystalloids*, and are regarded by some as resting states of protoplasm. Aleurone grains also contain other bodies called *globoids* and crystals of calcium oxalate. *Crystals* are found widely distributed throughout the vegetable kingdom, but are most abundant in the higher plants. The name raphides was formerly applied to the needle shaped crystals found in some plants, but now it is applied to all forms of crystals found in vegetable tissues (Plate B, Fig. 11). Crystals, gums, resins, and the volatile oils, are regarded as excrementitious matter, waste material which the plant has absorbed, but which the protoplasm could not use.

Many plants secrete oil. This occurs as separated drops among the other contents of the cell. In some instances the tissues contain from thirty to forty per cent. of oil. It is particularly found in the tissues of seeds, as in the castor oil bean, the flax, olive and palm. These oils are termed *fixed oils*, to distinguish them from the volatile or essential oils before referred to. Various *acids* are also found in plants, particularly in fruits.

Diatoms and equisetums contain *silica* in their cell walls. It is often deposited in regular and beautiful figures, as you have all observed in the microscopic exhibits of Diatoms, which are usually not the living plants, but the skeletons of silica from which the living parts have been separated.

Protoplasm possesses the power of imbibing water. When it is more than saturated the surplus water stands in drops in the midst of the protoplasm. These drops are called *vacuoles*, and they are often so large that they occupy the greater part of the cell, crowding the nucleus to one side, and causing the protoplasm to present the appearance of strings and bands stretched across the cell between the vacuoles (Plate D, Fig. 12). This water, which is called the cell-sap, holds in solution important food materials of the plant, and is very variable. The sap contained in the vacuoles represents the reservoir out of which the protoplasm supplies its needs. Sachs says: "The function of water in the cell is a very manifold one. It is at once the general solvent, and the agent of transport of the food materials within the cell. The water itself enters in many ways into the chemical constitution of the substances produced in the plant. Its elements are essential to the production of assimilated substances. To the formation of organized structures, the protoplasmic structures, and the starch grains, it is indispensable. The growth of the whole cell depends immediately upon

the absorption of water and the accumulation of cell sap as vacuole fluid."

Water is thus seen to be emphatically the right hand man of protoplasm. Of the substances held in solution by the cell-sap, sugar is the most important. It exists in two varieties, *glucose* or grape sugar, found in fruits, and *sucrose* or cane sugar, found in sugar cane, sugar maples, beets, watermelons, &c. Sucrose cannot be produced artificially, but glucose can be made in quantities to suit customers, from starch cellulose and dextrine, by means of acids. Glucose contains one molecule more of water in proportion to the carbon than sucrose does.

Another vegetable product called *inulin* is found dissolved in the cell-sap of many Compositæ. It has the same chemical composition as starch, but differs from it in being soluble in water. In sap obtained by boiling, it precipitates after a while in the form of a white fine grained powder. By treatment with iodine this powder takes a yellow color which serves to distinguish the substance from starch. Inulin, like starch, is one form of reserve material.

Having now considered the contents or products of vegetable cells we will attend briefly to some of their shapes, sizes and combinations. The normal shape of plant cells is roundish, but pressure, unequal nourishment, and many other circumstances incident to their environments cause multitudes of irregularities, both in form and size. Such curious, special and unexplainable shapes as are found in the interior of the stem of *Nuphar advena* (Plate A, Fig. 13), upon the under surface of the leaf of *Shepherdia Canadensis*, and those containing the cystoliths found under the hypodermal tissue of the leaves of *Ficus elastica* are termed by Sachs idioblasts. These are extraordinary forms. The ordinary forms may be classified as long and short cells, but whether long or short, they are almost always microscopic in size. The short cells are said to vary from about $\frac{1}{250}$ to $\frac{1}{1200}$ of an inch in diameter, while the long cells, though sometimes a quarter of inch long, are frequently less than $\frac{1}{1500}$ of an inch in diameter. Some one has carefully estimated the average diameter of plant cells to be $\frac{1}{333}$ of an inch. It follows then that a very large number of cells must be combined to form even an average-sized plant. The lowest plants are unicellular, that is, composed of a single cell during their whole term of life (Plate A, Fig. 14). All plants at their earliest stage consisted of one or a very few cells. The process by which cells are multiplied is not by any

means the least interesting topic the histologist has to consider. In some of the Algæ the protoplasm of a single cell separates into quite a large number of minute portions, and each portion proceeds to secrete for itself a wall of cellulose (Plate A, Fig. 15). When the progeny are developed the old cell wall bursts and the young ones are free. I have often observed plants in this condition and have seen the cilia developed and the progeny in active operation before their separation from the parent, and a lively home scene it was. A little pressure with a cover glass is sufficient, under such circumstances, to burst the old cell wall, and the new plants whirl away to live their little lives and repeat the experience of their ancestors. This process of division is called endogenous cell-division. A more frequent method of cell-division is where the contents of the cell divide into two instead of many parts, and each of these into two others. The contents of the cell divide through the nucleus, if there is one, and in the space left between the parts, as they withdraw from each other a thin cellulose wall like the wall of the cell is built, which grows in thickness and develops two layers, one for each cell. This process is called multiplication by simple fission. The rapidity with which this process is carried on is almost incredible. One author states, that one hundred and forty millions of millions of Diatoms are produced from a single diatom of the genus *Gallionella* in twenty-four hours. The same process, which, from a single unicellular plant produces a great number of individuals, in the higher plants forms aggregations of cells called tissues. The simplest tissues are found in the filamentous algæ, where the tissues consists of a single row of cells united at their ends (Plate B, Fig. 16). Such tissues result from a division of the cells in one direction only. In some cases the cell are short and broad, in the nostoc they are round, (Plate B, Fig. 17), in others they are greatly elongated. Cell division in two directions constituting cell surfaces is found in the leaves of some mosses, but in ordinary vegetation the cell fission has been in the directions of length, breadth and thickness, the result of which is a mass of greater or less solidity.

As plants increase in size and become more complex as to their organs ; as roots, stems, leaves and special reproductive organs are developed, it is easy to understand how considerable differences in the tissues of different parts would arise, and we are not surprised at finding sufficient differences to constitute a basis for the classification of tissues.

Numerous as the varieties are, we find their various combinations serving three general purposes, viz: that of suitably covering enclosed parts, of strengthening parts needing special solidity, and of filling up and giving symmetry to the whole. The tissues which go to serve the first of these three purposes constitute the epidermal system of tissues, the second, the fibro-vascular system, and the third, the fundamental system. Various combined to form these three systems of tissues are seven so called elementary permanent tissues, based upon the differentiations before alluded to. But even in the highest plants this differentiation takes place progressively. The growing portions of the plant, as the tips of roots, stems and leaves consist of a uniform tissue, out of which by diverse development of its layers, these tissue system have their origin. This tissue of the youngest part of plants is called primary tissue, primary meristem, or proto-meristem. In most of the cryptogams the primary meristem is formed by the repeated divisions of a single mother cell, at the apex of the growing part. In the Phanerogams it is developed from a group of cells instead of a single one; the apical cell together with the daughter cells, in the immediate vicinity, constitute the *punctum vegetationis* or vegetative point of the organ. Of the elementary tissues, the most abundant one is called *parenchyma*. It differs only slightly from the primary meristem. It makes up the whole substance of many of the lower plants, and forms the pith of all exogenous stems. The cells of this tissue vary greatly in form, but are uniformly thin-walled (Plate C, Fig. 19). Beneath the epidermis of dicotyledons, a layer of tissue of considerable thickness is found which consists of elongated cells, the angles of which are greatly thickened while the sides remain thin. It is doubtless developed from the *parenchyma* for the purpose of giving support to the epidermis. This tissue is called *collenchyma* (Plate D, Fig. 20). Any one who has attempted to dig up the root stock of a fern, or has tried to cut a very thin cross-section of it, knows how hard and strong its tissues are. The thick walled cells near the surface form the tissue, called *sclerenchyma*. The cells of this tissue are very irregular in form, but agree in having thick, hard walls (Plate E, Fig. 21). The tissue called *prosenchyma* or fibrous tissue makes up a large part of the wood of exogenous trees. It consists of long flexible cells, tapering and closed at both ends. The ends of the cells overlap each other forming a tissue of great strength (Plate C, Fig. 22). There are two varieties of fibrous tissue, wood and bast. The bast is the inner bark of dicotyledons. Flax, hemp and jute are illustrations of bast tissue. In

many plants there are found tissues whose cells are filled with a milky juice, the latex. These tissues vary greatly in their general characters, but on account of this one peculiarity they have received the name of *lactiferous* tissues (Plate C, Fig. 23). Another kind of tissue is the seive tissue, so called from the perforated walls which separate the cells and the perforated discs which are found in the sides of the cells.

Perhaps the most interesting of all the tissues, that most sought for by amateur microscopists is the *trachenchyma* or tracheary tissue. It comprises all those curious vessels which combined with fibrous tissue, constitute the fibro-vascular system of tissue. These vessels, ducts or tubes, as they are variously called, are developed from rows of superposed cells, the partitions which separate them having been absorbed. By various thickenings of the cell walls, the spiral, pitted, reticulated, scalariform, and annular vessels are formed. To obtain these vessels it is only necessary to cut a sufficiently thin longitudinal slice through the fibro-vascular bundle of any stem. The location of the bundle may be determined by examining a cross-section of the same stem.

There are many points of interest connected with the development of the epidermal system. In the epidermis of leaves and stems, small openings are formed, through which for physiological reasons the air circulates and is brought into contact with the inner chlorophyll-bearing cells. They are often called breathing pores. Their technical name is stomata (singular stoma). Each pore has two peculiarly developed cells (saw-sage-shaped, Hooker calls them), at either side of the opening, termed guard cells (Plate B, Fig. 29). Stomata are very numerous upon some leaves. Weiss determined the number to the square inch, upon both upper and under surface of the leaves of 137 species of plants. The greatest number found was 403,125. Some leaves have none upon the upper surface while the under side is well supplied with them.

You have all observed the inequalities in the surface of plants, as smooth, rough, sticky, prickly, &c. This is due to secretions or growths of the epidermal cells. The bloom upon the plum and the peapod is a secretion of wax, which, being insoluble in water serves to protect the fruit from the action of the elements. A regular outward growth of the epidermal cells gives the velvety appearance to the petals of many flowers. This growth consists of a single cell or a row of cells (Plate D, Fig. 30). They all serve the plant upon which they are found some valuable purpose. In their relation to us they may amuse us as do the stellate hairs of the *Shepherdia*, sting and poison us as does the

nettle, or clothe us as do the epidermal hairs upon the seeds of the cotton plant.

The various tissues which I have described enter into the structure of the higher plants with almost infinite modifications, but all plants above the mosses, in their essential characters, form three classes, one of which belongs to the flowerless and two to the flowering plants.

Upon making a transverse section of a twig, from any of our trees or shrubs, we find in the center parenchyma which is commonly called the pith, next to the outer edge a layer of bark, and between them a layer or layers of wood. Connecting the pith with the bark are lines of tissue called medullary rays. Although the proportions differ greatly in different species, yet all those of this class have these general characters; bark, pith, wood and medullary rays. In such a stem growth is accomplished by means of successive layers of new wood on the outside of that already formed. Between the bark and the wood is a soft undifferentiated layer of tissue called the cambium layer in which protoplasm does the building of the stem, forming on one side wood-fibre and vessels for the body of the tree, and on the other bast tissue for the inside of the bark. As the wood grows by additions to the outside, these stems are called exogenous (outside growing), although the bark grows by endogenous or inside growth (Plate D, Fig. 31). Trees which belong to this class have two cotyledons in the embryo and present the highest development of the vegetable kingdom. All herbs having two cotyledons present the same essential characters, though the wood may be represented only by a row of fibro-vascular bundles surrounding the pith and the bark by one or more layers of epidermal tissue. Even in the delicate leaf stalk of the oxalis one may, with a pocket lens, discern the concentric layers characteristic of the exogenous, or as it is also called dicotyledonous stem. In the case of trees it has been customary to believe that one new ring of wood is formed each year, and that by counting the rings of the stem the age of the tree can be determined; but the spirit of careful observation and inquiry which is all the time at work now-a-days undermining and exploding our prejudices has shown that a cold snap or dry spell any time during the growing season—anything which hinders the builder even for a short time—leaves its mark upon the work, and that several rings may be formed in a single season. Trees consequently are never older but often much younger than they appear (?).

If we examine the stem of a grass, rush, sedge or lily, we find no such

concentric arrangement of the tissues. The whole stem is pervaded by cellular tissue through which the fibro-vascular bundles are interspersed in greater or less numbers (Plate D, Fig. 32). We have no trees in our climate belonging to this class. The Palms of the tropics show the same structure. When the stem lasts for more than one year, as in the case of the Palms, growth is accomplished by the development of new fibro-vascular bundles, and these are deposited inside those previously formed. The stem on this account is called endogenous (inside growing). As all the exogens have two cotyledons so all the endogens have one, and monocotyledonous is synonymous with endogenous, as dicotyledonous is with exogenous.

The third class of stems is but poorly illustrated in our latitude. The ferns, lycopodiums and selaginellas grow at the end instead of the outside, and are therefore named acrogens (end growers). The tree ferns of the tropics are the most important members of this class. The stem consists of parenchyma, variously interspersed with plates and irregular masses of the fibro-vascular system. On the inside is a hard rind of sclerenchyma (Plate E, Fig. 21). The latter tissue is also scattered through the stem in greater or less abundance. There are no means internal or external of determining the age of such stems.

In the brief space of a single paper, I have been able to give only the merest outline of this very broad and intensely fascinating subject. Through all its length and breadth it abounds in still more interesting, already discovered details: while from the vast fields of the undiscovered, beckoning hands are waved toward every one of us.

It is an easy task to prove that these illustrations are not fancy sketches. Take for instance a slip of Begonia. With a microscope, a sharp knife and a little iodine, you can readily observe the parenchyma, the collenchyma, the spiral vessels, the epidermis, the trichomes, the stomata, the protoplasm, the chlorophyll, the starch and the crystals which it reveals, and when once imbued with the spirit of this work, I believe you will agree with me in saying, that if Bryant on his native hills seventy years ago heard nature speak "a various language," we in our laboratories to-day may repeat with unction the slightly varied words of Horace Smith :

" Were I, O God, in churchless lands remaining,
Far from all teachers and from all Divines ;
My soul would find in *plants* of thy ordaining,
Priests, sermons, shrines ! "

THE ASSIMILATION OF FOOD IN RELATION TO
ACTIVITY.

BY CHAS. T. HOWARD, D. D. S., ROCHESTER, N. Y.

[Read before the 7th District Dental Society, (N. Y.), April, 1884.]

While dental therapeutists have been discussing the value of preparations for the improvement of the teeth, the subject of exercises has been sadly overlooked. The good accomplished during the administration of medicines is attributed entirely to their effect, and other agents, though present, are not recognised.

Standing before a collection of ancient statues, admiring them, even when mutilated, is like occupying the position of a student of medicine who is filled with wonder and admiration as he looks at man, though aware grave defects mark each one he meets. In spite of injuries and imperfections, he is conscious a type exists worthy his search and imitation. Occasionally he catches faint glimpses of its presence. It here and there glides across his path; the perfect made useful, the useful adorned.

The great defects that take the dentist's attention are those found in the teeth. He sees such wholesale destruction of dental tissue that he trembles at the prospects of future generations. But his trembling is not constant. At times there comes to his notice teeth that illustrate possible perfection, and cast rays of hopeful light on the future. These teeth it is his duty to study, with all things bearing upon them, and show what relative value each surrounding influence has had in the production of such an excellent a result.

Though this paper deals only with the influence activity exerts in improving the teeth, it does not hold it the only thing at present necessary for their perfect development. But if any one thing is to be chosen above all others, that one is energetic chewing.

In Dalton's Physiology, under "The Requisite Quantity of Food," is the following: "The entire quantity of food required per day varies with the circumstances of the individual, such as the size and weight of the body, the comparative development of the muscular and other

systems, the temperature, and especially the amount of physical activity. More food is required on the average in cold than in warm weather, more by persons of a muscular than by those of an adipose or phlegmatic constitution, more in a condition of active exertion than in one of comparative repose." As the "relative increase, under different conditions, of albuminous and non-nitrogenous matters in the food." Placing, "as the bare subsistence diet, albuminous matter at 100, and non-nitrogenous matter at 100," he gives, "as the diet of a hard-worked laborer,

Albuminous matter.....	245
Non-nitrogenous matter.....	189

Showing a wonderful increase under the influence of physical activity." Thus active exertion especially influences the amount of food required. But is this extra amount of food consumed only to perform the task on hand? Its consumption results in the improvement of the tissues that bear strain during the performance of the task, and when the first task ends, if it is not so great as to cause exhaustion, the tissues are better fitted to meet the next. But if no next comes the tissues will return to the condition they were previous to the first, or to such a condition as will meet every day wants. When exertion ceases, not only is the extra allowance of food discharged, but also the extra tissue, formed to meet the requirements of exertion, is broken down and thrown off. The quantity of food required by the body during active exertion is poison to it when in a condition of repose. No food will be elaborated by the body unless the activity is such as to make the tissues feel the want of it. The body cannot be kept in a better condition than the demands upon it make necessary. There is a hereditary form and growth that originally takes place; but unless, after a certain time, the organs, or parts that result from this first growth, are exercised in their proper function, more or less deterioration is sure to follow.

What has been said finds illustration on every hand. The development of the blacksmith's arm. The strength acquired by a limb when its mate is injured. The development of a bone when one that formerly bore part of the burden is destroyed. The hardening and strengthening of muscles by exercise or labor, and their softening and weakening by idleness. These are sufficient, though more could be named—all bearing testimony to the improvement of the part used from the working of the fingers to the training of the mind. Every organ or part has a

function, and, whether depressed or not, is called upon to perform a certain amount of labor. And when proper food comes within its reach it is taken because it is needed. With organs influenced as to their use, by man's will, assisted by all the art an ingenious race can develop, this constant demand is not present. The process of mastication is slighted, and the teeth invited to assume a form of degeneration.

On the phrenologist's chart, opposite and back of the molar teeth, is the word digestion. This position marks the muscles of mastication. The connection they have with digestion is seen by examining the mouth. The teeth will be found worn and hard. They have not slighted their work to the detriment of the stomach. The exposed dentine is polished as glass, and almost as resistant to the instrument as ordinary enamel. Good muscles of mastication are generally accompanied by good teeth.

It is commonly thought that tobacco benefits the teeth, because the teeth of those who chew it are generally good. They also have good muscles of mastication, teeth worn smooth by use, and possibly good digestion. This holds true more with those who begin the habit early in life, though they do not continue it long, than with those who begin later. They lay the foundation, and though tobacco be abandoned, other things are chewed with the same energy. The habit of tobacco chewing encourages the activity that creates the need, and fosters the elaboration of lime salts in the teeth, the same as the chewing of gum.

It is seldom, if ever, the habit of gum chewing extends through a long period of years, and little can be said in regard to its effects on the teeth; but from analogy the stronger evidence appears in its favor. This should not be understood as encouraging the chewing of tobacco as beneficial for the teeth. The same good results can be attained by means not offensive and detrimental to the gentleman, and at much less cost—by using the teeth at the table as energetically as the tongue at the club and social. A third molar, erupted at a time when other parts of the mouth are in a condition to perform chewing without pain, is quite certain to last a long time. If old roots or sore teeth and tender gums unfit the mouth for chewing, the chances are against the third molar ever amounting to much. If, on the other hand, the roots and teeth have been put in proper shape and the gums cured, the third molar will be pressed into service soon as erupted, and, in time, acquire great density. Thus how essential that the mouth be kept in good condition from the first; for what is true of the third molar is true of every tooth in the permanent set.

It is frequently the case when there are two teeth poor in quality, to see one rapidly improve after the other is lost ; and with this improvement comes wearing of surface, a thing it never showed before. Confined invalids very often possess good teeth. Such persons are not crowded by cares. They take their time in eating. Their teeth have comparatively a great amount of exercise. And, aside from the care received, such teeth have ample reason for being above the average. In short, good teeth are found where they might be expected ; in the mouths of those who chew, instead of having the cook-stove or the stomach do their eating.

The dentists, with their hypophosphites and lactophosphates of lime, and the recent theory that mineral substances and compounds are not elaborated in the human system, unless they have previously been elaborated in some plant or lower animal, may have obtained good results in the teeth. But with the administration of their respective agents comes renewed energy created by greater cleanliness, healthy gums and filled cavities. Chewing is made painless, and food tastes better. In view of this, the good results are not so attributable to the hypors or lactors or lower organisms as to the need created by the increased work those teeth were made to perform. The dental therapist should accompany his lime salts with a chewing exercise ; create the need, then furnish a supply.

The causes of poor teeth are numerous ; but, among them, prominent and conspicuous, are self-imposed lack of time, laziness, and parental care in the mask of nicely cooked soft food, and the "don't hurt yourself by eating that tough meat." They all have played their part, and each has a charge to answer in the present condition of tooth tissue. And even the poet, who should sing only truth, figuratively leads one astray by the lines—

"This conclusion then I draw,
That no exercise of jaw,
Twisting India-rubber law,
Is as good
As the the exercise of paw
Through the handle of a saw,
Sawing wood."

PRACTICAL NOTES

Pericementitis is best combatted with "mercurius vivus" in two grain doses every hour, and application of tincture of iodine to the neck of the tooth and its adjacent gum. Half food rations, also, until better.

Alveolar abscess is successfully treated by forcing through the root and gum a stream of carbolic acid or creosote, from the tooth through the external opening in the gum. The canal previously to be washed with water and then with alcohol.

Pyorrhoea Alveolaris is treated with chloride of zinc paste, first scraping the roots with paper-thin spring-tempered instruments. This has been my practice for seventeen years. The diet of the patient must be attended to in bad cases, in which common salt and all irritating condiments must be forbidden. Lemon juice should at the same time circulate abundantly in the blood.

Exposed pulps I endeavor to save, but fail in half the cases I have. I treat them in the orthodox fashion. When I destroy the pulp I have good success in preserving the health of the tooth. My method is to apply arsenic and creosote, and remove the poison next day. Not until fourteen days do I try to remove the pulp and root vessels. Then it can be done without pain.

The roots are then cleaned with water, then alcohol, and plugged with a thick solution of gum sandarach and cotton. The crown is plugged with the same. Thus the tooth remains for a month or longer, for the plug is good for three months. In a month or three months after the removal of the pulp the crown is permanently plugged. The root already contains its permanent plug.—CHASE, *Address before New England Dental Society.*

CHROMIC ACID.

BY C. J. BARBER, D. D. S., AUBURN, N. Y.

[Read before the 7th and 8th District Dental Societies, Oct., 1884.]

When called upon at the last annual meeting of our Seventh District Society for a paper for the joint meeting of the Seventh and Eighth, I firmly resolved that I would at once select a subject, and prepare a paper that would be, if possible for me to make it so, interesting to the society and a credit to myself; but, as is too often the case, it was left, neglected, and put off for something else, until a card, from the Chairman of the Business Committee, forcibly reminded me of my duty.

This drug, which I have chosen as the subject of my paper, is a new one in the materia medica of the dental profession—at least as far as my personal knowledge goes, as I have never before known or heard of its being used as a remedial agent in dentistry. Its use as a dental medicine was discovered by me accidentally—as the idea that it might be used for the purposes mentioned further on occurred to me while using it for another purpose—for which, however, it ignominiously failed. If, by bringing this remedy to notice, I add a new idea to the profession, I will be happy in the thought that I have done at least a little good.

Although I have not experimented with it to a great extent, probably its range of usefulness is rather limited, but as far as that is concerned the same thing may be said of many other of our remedies, for with the exception of creasote and carbolic acid most of them have their specific uses only. In using it one must exercise great care, especially in cavities close to or under the gum, as it is powerfully escharotic, and very apt to cause great sloughing of the soft tissues.

Chromic acid is readily obtained by mixing 100 measures of a cold saturated solution of bichromate of potassium with 150 measures of sulphuric acid, and allowing the mixture to cool. The sulphuric acid unites with the potassa, and sets free the chromic acid, which is deposited in crystals. The mother liquor having been poured off, these are placed upon a tile to drain, covered with a glass bell jar.

Chromic acid is in the form of anhydrous, acicular crystals, of a brilliant crimson red color, and an acid metallic taste, deliquescent, and very soluble in water, forming an orange yellow solution. It is a teroxide of the metal chromium, having the formula Cr_2O_3 . It is a

powerful oxidizing and bleaching material, and gives up its oxygen with great facility to organic matter, which is at the same time dissolved. At first considered only as an escharotic, in which capacity it has extraordinary powers, it has since been shown to be antiseptic and disinfectant, with the property of destroying germ growth.

In these latter powers it is asserted by Dr. JOHN DOUGALL (*Lancet*, Dec. 16, 1871), who founds his conclusions on experiment, to be second to none, and, in some respects, to surpass even carbolic acid. A piece of fresh beef immersed in a solution of chromic acid, containing only one part in 2,000 of water, became in two days quite black, in six as hard as wood, and at the end of three months, remained perfectly free from mould or taint. It appears to owe its antiseptic action to its power of coagulating albumen and all protean compounds, in which it has been found to exceed all the acids and metallic salts that were tried, being ten times stronger than carbolic acid, fifteen stronger than nitric, and twenty times stronger than bichloride of mercury. It is, therefore, one of the best tests of albumen in a fluid, 2 grs. dissolved in an oz. of water, readily detecting its presence in a solution containing a saturated solution of beef juice in 20 of water. Besides coagulating albuminous substances, it oxidizes decaying organic matter, combines with and neutralizes the escaping ammonia, and decomposes sulphuretted hydrogen, reducing it to water and free sulphur. Added to putrefying animal matters, it destroys their offensive odors, and keeps them fresh indefinitely. It is one of the most powerfully destructive agents to inferior organic life, greatly exceeding carbolic acid in this respect, and, therefore, one of the most energetic disinfecting agents known, according to the view of those who consider the process of fermentation as the basis of many febrile diseases, and fermentation itself as the result of organized agents.

Chromic acid has been used medically only as an escharotic, in which capacity it acts by rapidly oxidizing, and then decomposing the tissues, while by the loss of half its oxygen, it is itself converted into the inert sesquioxide.

Used in substance made into a paste with water, its action is exceedingly slow and gradual, but deeply penetrating. In saturated solution its action is less penetrating and less gradual. M. ISAMBERT has employed the acid with advantage in scorbutic diseases of the gums, ulceration of the mucous membrane of the mouth and pharynx, and in similar affections of the larynx, with the aid of the laryngoscope. He

has found it also very efficient in oedema of the glottis, so as in several instances to have obviated the necessity of tracheotomy.

What I would like to call attention to it for, is its use as an obtunding agent in sensitive dentine, and in chronic inflammation and tumefaction of the gums. I used it for the former because of its power of penetrating without causing much pain. The trouble with all of our obtunding agents so far, with the exception of arsenic, is that the remedy is as bad as the disease, as they cause as much pain as the drilling itself, and arsenic is very apt to kill the pulp.

In using the chromic acid I first drill as much decay away as I can without much pain, and then, if the cavity is near the gum, put on the rubber dam. Then dry the cavity thoroughly, and place in it chromic acid crystals, about the size of the head of a pin, more or less, according to the size of the cavity, add a quarter of a drop of water, and instantaneously a sharp pain will ensue, followed by a dull pain lasting about a minute. When the pain of the application has entirely ceased, quite a little tooth tissue can be drilled without any pain to speak of.

Of course, as a rule, it is a great nuisance for us to lose our valuable time obtunding sensitive dentine, but quite often we have a very agreeable lady patient in the chair, over whom, perhaps, we are willing to spare more time than is necessary, and to whom we would like to make ourselves agreeable, and have the operation hurt as little as possible. Generally in these cases we expect to be pretty well paid for our time, so that in two ways we are apt to be well pleased with results. One is in getting a good round fee for time spent in operating so carefully, gently, and with so little pain, and the other is in passing a very pleasant time with a very pleasant patient.

In morbid growths of the gums it need not be used quite as strong ; a solution of equal parts acid and water usually being plenty strong enough.

When applied to the gums it causes no pain whatever, and in a few days a line of healthy demarcation is formed, followed by a sloughing of the dead part, and a healthy granulating surface underneath. These two classes of cases are all in which I have used it, but I have no doubt that it can be used in other cases of disease of the oral cavity, either in different solutions or in combination with other remedies.

THE BOSTON VEGETABLE ANÆSTHETIC COMPANY'S VAPOR.

The following letter, etc., from Dr. A. M. Ross, of Chicopee, Mass., is the pains-taking response to a request we made for a report upon the subject, and for which we tender our thanks. L.

CHICOPEE, Mass., Nov. 18, 1884.

* * * * *

In reply to your last letter, I will say that on the morning of the first day of our meeting [Conn. Valley Dental Society] the manager of the Boston Vegetable Anæsthetic Co., R. J. Hunter, was on hand with several cylinders of "vapor," gasometer, etc. Dr. Geo. A. Maxfield, of Holyoke, Chairman of Executive Committee, had arranged for a simple experiment, one calculated to show how long life could be sustained in the respective gases, "vapor," and pure nitrous oxide. An air-tight case with glass sides, and with openings at the base and top for ingress and egress of gas was prepared, and two full-grown rabbits of same litter and sex were selected. One was placed in the box, the vapor turned on, and the moment that a charred splinter of wood ignited, or rather burst into flame, time was taken, and, in 7:50, respiration had evidently ceased. Upon removal from the case all efforts at resuscitation failed. The same experiment with the other rabbit, substituting nitrous oxide from White's depot for "vapor," resulted in death in 3:30. I suppose that this experiment has not any great value. Some claim that nitrous oxide, with an occasional admixture of atmospheric air—which is simply mechanical and not a chemical compound—would result the same as experiment No. 1. But personal experience leads me to believe that it is dangerous to proceed in such a way in producing anæsthesia. Mr. Hunter acted the perfect gentleman, and in reply to inquiries was as communicative as one could be who had two patents pending at Washington upon certain *so-to-be-called* ingredients of his compound. I am neither a stockholder in the B. V. A. Co. nor a defender of proprietary articles in medicine, and I think this "vapor" to be stronger flavored with humbug than checkerberry; but still it *may be* that anæsthesia produced by a chemical compound just so much slower than it is produced by *pure* nitrous oxide, is just *so much* safer than the latter.

The difference in analyses by two chemists is quite remarkable, both working from the contents of the same cylinder.

Please return the copies of analyses, and oblige,

Sincerely yours,

A. M. Ross.

P. S.—These analyses were made previous to the meeting, and following the experiments were given to the meeting.

ANALYSIS OF GAS FOR DR. MAXFIELD.

Holyoke, Mass., November 11, 1884.

The Gas consists of—

Nitrous oxide, or laughing gas.	99 per cent.
Vapors of an ethereal chloride, probably methyl-ehloride, or ethal chloride, or a trace of chloroform	1 per cent.
	100 per cent.

How any honest concern can claim the gas to be made of hamamelis, etc., is inexplicable to me.

The following conclusive tests were made :

1st. The specific gravity was determined exactly at 0° C. and 760 in. barometer (32 F. and 30 inches) to be (air=1).

The gas in question 1.51

Pure nitrous oxide 1.52 (according to Reynault)

The difference is less than 1 per cent., and obtained by the admixture of lighter volatile vapors like the above mentioned chlorides ; any considerable (more than 1 per cent.) amount of chloroform is excluded, as its vapor is very heavy (4.3 spec. weight, air=1).

2d. The gas is non-inflammable, hence no variety of organic ethers, or organic volatile chlorides, amounting to more than 1 per cent.,

3d. A glowing splinter of wood thrust into the gas will burst into a flame, leaving as combustion products only nitrogen, carbonic acid, and a trace of nitric acid.

4th. Treated by organic analysis, the gas shows—

1. The presence of a trace of chlorine.

2. The presence of a trace of organic volatile hydrocarbons, both amounting to less than 1 per cent.

5th. Physiological experiments I made myself with the gas on myself, show

A pleasant odor of a volatile organic ether in traces.

The general and ordinary effect of nitrous oxide in every single particular.

An effect upon the heart, slightly stronger than pure nitrous oxide.

Not any more pleasant or unpleasant after-effects than pure nitrous oxide.

Summing up, the gas might be called : *Impure Nitrous Oxide.*

(Signed)

CHAS. MAYR, A. M.,
Analytical Chemist.

Springfield, Mass., Nov. 12th, 1884.

Holyoke, Mass., Nov. 3d, 1884.

Dr. GEO. A. MAXFIELD.

Dear Sir : I herein certify that I have made the following direct determinations in analysing a sample of the Boston Vegetable Anæsthetic Co.'s Vapor :

Nitrous oxide,	1st det.	91.08 per cent. "
"	" 2d det.	90.00 " "

Tests were made for nitric oxide, nitric dioxide, carbon dioxide, oxygen and nitrogen, and no trace of any of these gases detected.

The " Vapor " also actually contains a minute amount of matter due to the herbs used in its preparation. Quantitative determination of this not made, according to arrangements.

Yours truly,

(Signed)

MARTIN L. GRIFFIN.

AIR, WATER, AND BALSAM, OR CROWN GLASS ANGLE.

BY ERNST GUNDLACH, ROCHESTER, N. Y.

There has been a great deal of discussion at different times whether or not the actual angular aperture of an objective can be above 180 degrees. Of course it cannot, but for a given *angular* aperture the *actual* aperture of the objective has to be larger for an immersion medium of higher refractive power than for such of lower refraction.

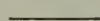
If the outer medium is of low refractive power, for instance air, then the light rays of the object undergo at the front surface of the objective a refraction of a certain angular value according to the difference of refractive powers of the glass and the air, and the extreme peripheric rays describe the angle of aperture *for air*. Suppose this angle to touch the maximum of 180 degrees, and the actual aperture of the objective just large enough for this angle. Now replace the air by water, then this angle will be reduced to 96 degrees, because the difference of refractive powers of crown glass and water is accordingly smaller. And it is clear that the actual aperture of the objective, being just large enough for the maximum *angular* aperture in *air*, will have to be considerably larger for this maximum in *water*. Hence an objective with an angular aperture of over 96 degrees in *water* is of *larger* angular aperture than 180 degrees in *air*.

If again the water is replaced by a still denser medium, say such of a refractive power equal to that of crown glass, then the rays on entering the front lens (being of crown glass) will not be refracted at all, and the angle of aperture still more reduced, and consequently the latter can be farther increased by enlarging the actual aperture or diameter of the objective. The diameter of the maximum actual aperture of an objective is twice the equivalent focal length of the same multiplied with the refractive index of the medium through which the objective works.



THE NEW LOCAL ANÆSTHETIC—COCAINE HYDRO-CHLORATE.

BY J. EDW. LINE, D. D. S.



[Read before the Rochester Dental Club, Nov. 11th, 1884.]

The comparatively recent statements in regard to this drug as a local anæsthetic, the present impossibility of obtaining a grain of it even for experimental purposes, and its very high price, make it an object of rare interest to every one, and especially to the dentist—not, however, because of what is known of it as a dental therapeutic so much as what is suspected and expected of it as an aid in our work upon sensitive organs and tissues.

As its name suggests, it is the product resulting from the treatment of cocaine with chlorhydric acid. Cocaine is the alkaloid obtained

from the *Cuca* of the South American Indians, or *Coca* of the Spaniards, and coca is a plant of the natural order Erythroxylaceæ, resembles the black thorn, and grows to a height of six or eight feet. "The leaves are used as a masticatory in the western countries of South America, and are the parts in which is found the alkaloid, "to which cuca owes its special properties." Good specimens of the dried leaves "have a strong tea-like odor; when chewed they produce a sense of warmth in the mouth, and have a pleasant, pungent taste. Bad specimens have a camphoraceous smell, * * * and lack the pungent taste." The leaves are used by the South American as generously and as industriously as prepared tobacco is by persons nearer home—the figures being placed at 8,000,000, and the chewers in Bolivia, Peru, Ecuador, Columbia, and Rio Negro.

Cuca is said to be "a powerful stimulant of the nervous system; it enables fatigue to be borne with less nourishment and greater ease than ordinarily, and diminishes the difficulty of breathing in ascending mountains." It is also said to be "a remedy for rheumatism and headache." Pöppig, in his *Travels in China and Peru*, says the cuca-chewing habit is "as dangerous to health as opium-eating"; and Lloyd in the *Journal of the Royal Geographical Society* (1854), speaks of it as a "poisonous narcotic." Other observing travellers and experimenters, however, testify to the contrary, and seem to commend rather than condemn the leaf and its use by human beings. The best kind of argument against Pöppig and Lloyd's statements is found in the number who habitually use the stuff, and the further fact that an able bodied South American Indian easily and habitually gets away with from two to three ounces in a day.

Cocaine ($C_{16}H_{19}NO_4$) is an alkaloid of *Erythroxylon Coca*, and the substance to which *cuca*, as already stated, owes its special properties. It was discovered in '59 by Niemann. "It is highly poisonous, and its physiological action is apparently identical with that of theine, caffeine, guaranine, and theobromine, which all (as shown by Bennet in the *Edinburgh Medical Journal*, '73) * * * induce a series of symptoms affecting the nervous, respiratory, circulatory, vasa-motor, and glandular systems."

The muriate of cocaine, or cocaine hydrochlorate, is found mentioned in Merck's catalogue. It had been known a year or more to laryngologists as an excellent application to the vocal cords, its anæsthetic effect facilitating examinations. It was the observance of this fact that led young Koller of Vienna to experiment with it upon the

eye, and it was he who supplied Brettauer with the vial of the solution used by him in eye operations before the Ophthalmological Congress at Heidelberg last September.

According to Dr. H. D. Noyes, of New York, one of the special correspondents of the *Medical Record*, it was the most notable thing presented on that occasion. He says: "Two drops of the solution (a two *per cent.*) were dropped into the eye of the patient at the first experiment, and after an interval of ten minutes it was evident that the sensitiveness of the surface was below the normal, then two drops more were instilled and after waiting ten minutes longer there was entire absence of sensibility; a probe was pressed upon the cornea until its surface was indented, it was rubbed lightly over the surface of the cornea, it was rubbed over the conjunctiva bulbi, and of the conjunctiva palpebrarum; a speculum was introduced to separate the lids and they were stretched apart to the uttermost; the conjunctiva bulbi was seized by the fixation forceps and the globe moved in various directions. In all this handling the patient declared that he felt no unpleasant sensation, except that the speculum stretched the lids so widely asunder as to give a little discomfort at the outer canthus. Before the experiment his eye was shown to possess the normal sensitiveness, and the other eye, which was not experimented on, was in this respect perfectly normal. The solution caused no irritation of any kind, nor did it at all influence the pupil. The anæsthetic influence seemed to be complete on the surface of the eye, and it lasted for about fifteen minutes, and the parts then resumed their usual condition."

Immediately upon the publication of Dr. Noyes' letter, specialists sought the dealer, the major part of them only to learn that the whole stock had been gathered in by earlier comers. A few of the more fortunate ones have already been enabled to put the drug to the test and publish their results. Prof. C. P. Agnew and Drs. William O. Moore and James S. Minor, who devote themselves to the treatment of the eye and ear, corroborate all that Dr. Noyes has said, and add new cases and new interest to the history of this most welcome agent. Dr. Agnew, in a case of convergent squint in a five year old, cut the scleral conjunctiva and internal rectus muscle; also the same muscle in a eleven year old, and in both without causing pain. Another case (six years of age) of the same kind failed because of the "nervous apprehension" of the child. • Examinations only were made in two cases, in one of which the parts were sensitive to a remarkable degree to both touch and light—a case of laceration of the eye-ball, involving the sclerotic. The

other was a case of double cataract—sensitive, of course, to touch only. Dr. Moore scraped an ulcer in a Chinaman's cornea, freely cut the conjunctiva in another patient, bringing the cut surfaces together by three sutures, and in a child of seven cut the internal rectus. Dr. Minor removed stitches from the conjunctiva of a ten year old boy, put there a few days before under other and less pleasant circumstances; and in a case of cataract, in a woman of fifty, made a large section of the cornea, and accomplished cystotomy and the removal of the lens easily and painlessly. All of which shows that cocaine hydrochlorate is prompt in its action, and effective even at some distance from the surfaces to which it is applied.

Dr. Geo. F. Shrady says: "It is quite certain that in those numerous cases in which local anæsthesia is necessary for minor operations in surgery, gynecology, laryngology, otology, and even dentistry, this anæsthetic will be tested. Especially would it seem to be indicated in those parts of the body which are covered by mucus membranes and plentifully supplied with sensitive nerves." A week ago last Wednesday, Prof. W. M. Polk, of N. Y., performed painless operations upon two women for laceration of the neck of the uterus. He is now engaged in experimenting with the drug to determine its effects when applied to the cervix and vagina in the exceedingly distressing pains of the first stage of labor.

Our own interest in cocaine hydrochlorate dates from the 20th of October, when we read the reports of Agnew, Moore and Minor. In our innocence we applied to a local drug firm for some of it, and was informed that they were not only without it, but did not know what it was. It was found in their copy Merck's catalogue as the alkaloid only, and worth \$4.00 per 15 grains. This firm wrote immediately to Merck's agents in New York, and two days later got for answer: 'Have cabled for it.'

As a consequence we are obliged to suggest a few of its probable applications in dentistry, instead of giving, as we had hoped when we said we would furnish a topic for this evening, the results of a series of experiments.

In tooth-extraction it may not be efficient, except perhaps to obtund the sensitiveness of the parts to which the beaks of the forceps are applied. As a remedy for toothache, whether from an exposed pulp, or one whose decomposition has been interfered with, it promises well. And from what has been done by the oculists we may rest

assured of its effectiveness in cases where the use of the lance is called for, as preliminary to tooth-extraction, envacuation of abscesses, scarrification of the gums, and the removal of abnormal growths. It seems, too, that it must work satisfactorily as an application to the gums previous to the introduction of the peg-wood wedge. But of all things calling most loudly for suspension of sensation, dentine ranks first, and if cocaine hydrochlorate meets this want, it will supply one much as well as long felt.

DENTAL CYCLOPÆDIA—MORE ABOUT THE PROJECT.

The following letter was addressed to members of the 7th and 8th District Dental Societies, read at the meeting held in Rochester, Oct., 1884, and ordered published. It adds material and interest to a subject that is likely to come up again for consideration in the near future.

L.

GENTLEMEN: You did me the honor, in Oct. 1875, at your joint meeting in Buffalo, to invite me, by resolution of Dr. Line, to elaborate a paper on the need of a Dental Cyclopædia, and read it before the State Society at its next meeting, May, 1876. I did so.

Many of you, probably, read the report of the committee appointed to investigate and report on the subject in May, 1877, in the *Transactions* published in 1878—two years after. It is not my purpose to write of what was doing for the Encyclopædia from the time that report was read till a corrected proof of my paper was published in the May number, 1878, of the *Oral Science Magazine*. But it became very clear to the writer, as well as to others, who encouraged the project long before that report was published, that to ask any society to assume the pecuniary responsibility in publishing such a work, was absurd; but the idea that a great society might sanction and foster such a project seemed reasonable and possible.

But that was not seriously attempted, for it happened that in July, 1878, Dr. Buck, editor of the English edition of Ziemnissen's Encyclopædia of Medicine, was shown a copy of my article on the *Dental Cyclopædia* by a medical friend of his. Dr. Buck was so well pleased with the project, that he was at some pains next morning to talk with Wm. Wood, of the publishing house of Wm. Wood & Co., of New York City, about it, with the following effect:

"New York, July 9, 1878.

B. R. McGregor.

Dear Sir: Dr. Buck has spoken to us in regard to a plan of yours for a Cyclopædia of Dentistry. While we should hesitate to undertake any very heavy work just now, we should be glad to have your views concerning it at your leisure—number of vols? pages? authors? possible number of subscribers? &c.

Very respectfully yours,

WM. WOOD & Co."

Mr. Wood was informed next day, in the concurrent words of those agitating the subject, that as soon as approximations of answers to his questions could be given, they would be made.

Here was a publishing capitalist, whose concern had just made \$75,000 from publishing the English edition of Ziemmsen's Medical Encyclopædia, voluntarily offering to consider the subject of a Dental Encyclopædia, if it could be put into an intelligible form, and willing to put his capital into it and produce it, if he could but know what it was to be, etc.

The projectors of the work instantly set themselves with redoubled energy to develop, in the first place, a plan of the work. That was so far effected within a year as to be easily made presentable to Mr. Wood, and which would have more than answered his questions, (except that about the probable number of subscribers,) but for obstacles that were not, if they could have been, overcome.

The writer well knows that the Odontological Society of New York would not commit itself to auspicate the work. Then there was a singular apathy and indifference to the project among dentists generally. He was constantly reminded of the caution he had received in a letter from the editor of the *Dental Cosmos* months before, to expect nothing but failure in trying to interest the profession in it, and the words of others indicating that the profession was not *ready* for such a work. This is easily explained.

The people of England were not without cyclopædias before the first really successful one was produced by Chambers in 1728. That work, however, was the supply of an unmistakable demand; and we know that it created new wants, since larger and better works followed from that time till now.

No, gentlemen, the project of the Dental Encyclopædia at that time

was a mistake—worse, a blunder. It could not help but fail, and it did fail.

In a long and checkered career I have always received your unswerving kindness—often I have not deserved it:—certainly I have reason to thank you, gentlemen, and think you will believe me when I say that I part from you regretfully, but retain my interest in the profession, and even more than before.

Very respectfully Yours,

RUSH MCGREGOR.

Albion, N. Y., Sept. 17th, 1884.

PULP-CAPPING AND TREATMENT OF PULP-CANALS*

BY J. H. BEEBEE, ROCHESTER, N. Y.

[Read before the 7th and 8th District Dental Societies, Oct., 1884.]

The old subject of pulp capping and treatment of empty nerve canals is well worn, and it is very difficult to advance in this direction anything new.

I will first describe my ideal of a pulp cap: It must be disinfectant, antiseptic, antiphlogistic, and a non-conductor of thermal changes; it must also fit the surface covered, accurately, and adhere to it; at the same time it must be absolutely unyielding.

For the purposes of disinfection, and as a destroyer of germs of tooth decay, regardless of the nature of the latter, I have found nothing that is more efficient than the old perfumery of the dental office—kreosote.

I am aware that very many of our practitioners have entirely banished it from their offices; but where an article has proved itself a good and faithful servant, it certainly seems poor policy to abandon it for anything less thoroughly subjected to the test of use.

As an antiphlogistic and antiseptic remedy iodoform has given the best results. I have seen the most obstinate cases of alveolar abscess promptly succumb to its soothing influence, when everything else had failed; pulps in a high state of inflammation have knelt before it, and cavities so sensitive as to render excavation impossible have been

* In deference to the wishes of the Business Committee, a modest body withal, the opening paragraph is omitted.

rendered comparatively painless when this drug has been held in them for a time, beneath a temporary filling.

It will be remembered that one part of the definition of the pulp cap as given calls for a non-conductor of thermal changes. The disastrous effects produced by the action of heat and cold upon the pulp in close contiguity to a metallic substance is too well known to all of us. Perhaps the best non-conductors are those of a vitreous or glassy nature. If an attempt is made to melt a piece of any of the resins it will be observed that while the surface of the piece is liquified the inner portions will remain brittle and hard, showing that this form of force is not readily conveyed by the atoms of the material. Among the hardest of the resins we find gum copal; it possesses the desirable property of solubility in one of the most volatile of substances—sulphuric ether. Another substance highly possessed of the property of resisting changes of temperature, is the phosphate or oxychloride of zinc, especially the former.

It is, perhaps, needless to say that no pulp should be capped while in a state of inflammation, it must, if diseased, show a great readiness to return to health, or give good evidence of healthy condition before the operation is performed. Having carefully removed all extraneous and decayed matter, unless a small amount of the latter be left immediately over the point of exposure, the cavity should be thoroughly saturated with kreosote, and wiped dry; then a saturated solution of iodoform in sulphuric ether should be introduced, and dried by permitting the solvent to evaporate. This is followed by copal ether varnish, of a syrupy consistency, which is to be dried thoroughly with the aid of a hot air syringe. If the point of exposure is large, it is my custom, before the varnish is dry, to introduce a piece of thin linen writing paper, cut the shape of the floor of the cavity, which is to be pressed down with an instrument until it adheres in every part; then I re-varnish, and dry as before. Over the whole is to be applied and allowed to harden, a thinly mixed paste of oxyphosphate of zinc. In case of large exposures or diseased pulps, it is best, of course, not to finish with metal at the same sitting, the operator using his judgment as to completely filling the cavity with oxyphosphate or gutta percha in the case of temporary completion.

The great value of the varnish is, of course, its non-conducting property, and the certainty with which, without pressure, it will adapt itself to the surface covered. But another and very great benefit is the protection of the sensitive tissue from irritant action of the phosphoric

acid in the plastic material, and especially is this the case when the paper before mentioned is used.

Have we not in the above that which we most desire—a cap that seals hermetically : that is a non-conductor of heat ; that is rigid, and at the same time an arrester of decay, and soothing to the pulp, and preventive of all inflammatory action ?

The same remedial agents are used in the treatment of pulp canals, and with satisfactory results. As before intimated, the most obstinate cases of alveolar abscess, either hidden at the apex of the root, or discharging through a fistula, rapidly improve when iodoform is presented to them. When all diseased action beyond the apical foramen has been removed, or is under control—and even sometimes when it is not, if there is a fistula for discharge, and the health of the patient is good, the canal should be thoroughly cleansed and dressed. It is not necessary to enlarge the canal unless it be extremely small, and it is desired to use a screw or other appliance for retaining a filling or crown. When cleanliness is ensured, apply kreosote as in pulp-capping, wiping thoroughly with cotton, wrapped in a nerve instrument. Next apply the ethereal solution of iodoform, and dry thoroughly ; now wet with alcohol, and having previously cut some slim pointed pieces of gutta percha, force them one at a time into the canal till it is filled. The alcohol will act as a lubricant, and will be forced out of the way, and in a short time the gutta percha will assume a consistency almost as firm as though it were solid. As I write, the thought has struck me that, perhaps, it might be well to use a thin sandraci varnish in place of the alcohol, and that would certainly make a solid and perfect plug.*

Many practitioners prefer some of the various forms of the zinc plastics for filling the canal, but the experience of the writer is against them, as he has found that where pus comes in contact with such material, the plug is dissolved and a passage will be burrowed right through it. Then, too, they are not perfectly dense and non-absorbent substances. Gutta percha, however, is one of the best substances that can be used in the mouth, for it is able to resist the action of any and every fluid, be they corrosive or otherwise.

If I have presented anything that is interesting I am gratified ; if nothing of interest, I thank you for your forbearance in listening to a short paper on a trite but hackneyed subject.

* Since the above was read, the writer has repeatedly used the varnish with the best of results.

DEFINITION, PENETRATION, AND RESOLVING POWER.

BY ERNST GUNDLACH, ROCHESTER, N. Y.

The definition of an objective depends on the correction of the spherical and chromatic aberrations of the same; resolving power on the angular aperture and the correction of the aberrations, penetration on angular aperture in the *negative* sense and correction of the aberrations. The definition of an objective can be improved by reduction of the aperture, because it shuts off the most imperfect part in regard to aberrations. This way of improving the definition is the more effective, the greater the uncorrected remnants or *secondary* aberrations are. A wide angle objective which does not considerably improve in definition by reduction of its aperture, can be regarded as of high quality, because the aberrations of the same are in high degree corrected, and therefore it will be of high resolving power according to its angular aperture.

Penetration, or so-called depth of focus, requires low angular aperture, therefore it can not be united with resolving power. An objective of 150 degrees, and high resolving power, requires separate focusing, for the least difference in focal plane, while an objective of 20 degrees, and good correction, although unfit to show a trace of the structure of any object requiring resolving power, will nevertheless give a true idea of the nature of an object, because it shows parts of different focal plane at the same time with sufficient distinction.

ANOTHER NEW CROWN.

Dr. C. S. Case, of Jackson, Mich., is the inventor of a crown that we were shown a short time since—one that ought to be illustrated and described in some enterprising journal. It has points of excellence not possessed by the Richmond, and is quite as easily adjusted as the Büttner.

PERSONAL.

Dr. F. E. Howard has sold his residence and practice in Geneseo to Dr. P. W. Stoddard, of Prattsburg, who will begin his labors in his new field April 1st. Both have our best wishes in the change.

DENTAL SOCIETY TRANSACTIONS (*Concluded from October number*).

In April and May, 1861, Prof. Lionel S. Beale delivered the lectures before the Royal College of Physicians of London, in which he promulgated his views, which have since been more or less elaborated, and which have become associated with his name. The "cell" or "elementary part," as he prefers to call it, is composed of matter in two distinct states, viz., matter which is forming, and matter which is formed; matter which has the power of *growing* by producing matter like itself out of *pabulum* or food, and matter which possesses no such power, but results from the death of the forming matter. The former is known as *germinal* or *living* matter, the latter as *formed* matter. The former in varying quantity in different cells, is central in its situation, and includes what has been called by other observers nucleus, cell contents, protoplasm, endoplast, etc. The latter also present in different quantity in different cells, is peripheral, and includes what is known as cell-wall, periplast, inter-cellular substance, and products of secretion. He is of the opinion that the amœba, the mucus-pus and white blood-corpuscles are composed almost purely of "germinal matter." In its endowments and properties, germinal matter is *acting*, *living*, *growing* and *moving*, through some inherent power of its own. It alone, as he believes, is capable of producing material like itself out of pabulum, and of multiplying by division, or dropping off a portion of itself, which portion assumes an independent existence, and grows maintains and reproduces itself like the parent germinal matter. This germinal matter is capable of being stained with an ammoniacal solution of carmine; the latest formed, or central portion, staining more deeply than that portion immediately surrounding it, and the further from the centre of the mass, the lighter is the color, until the *formed matter* is reached, which takes no color at all.

It must be understood that what is called nucleus by Virchow and others, does not constitute the whole of the germinal matter of Beale.

There may be other older germinal matter outside of the nucleus, on its way to conversion into *formed material*, but still possessed of life, and which assumes a tint with carmine, but not as deep as the nucleus, or centre. *Formed material*, he says, instead of being *active*, is *passive*, *non-acting*, *dead*, and can increase, only at the expense and death of the germinal matter, on the periphery of which it is formed.

Beale, however, took the most active tissues of the animal body, to wit, the muscles and nerves, for formed material. This position was vigorously assailed by Bastian, who showed the weakness of Beale's theory upon the ground mentioned. The nucleus itself was shown by

Brucke to be often missing, and by no means a constant part or portion of the cell. He also conceived the possibility of the granules being secondary products of the protoplasm, so much so that in his views the cell was a lump of protoplasm destitute of a distinct structure, and often lacking a nucleus. In this view he was followed by all German histologists, including S. Stricker, the editor of the *Manual of Histology*, the publication of which began in 1868, and was finished in 1871. Quite a discussion arose at that time among the savants as to the propriety of the term cell, and as to the necessary properties of a lump of protoplasm which would entitle it to the name of a cell.

New views as to the structure of protoplasm and tissues were announced by C. Heitzmann, in 1873. This observer discovered a reticular structure in a number of protoplasmic lumps, both in isolated individuals, such as amœbæ, colorless blood-corpuscles, etc., and constituent parts of tissues, such as cartilage corpuscles, epithelia, etc. The reticular structure of so-called protoplasm seems to have been first noticed by Alexander Nasmyth in 1839, who gives illustrations of this reticulum, but no comment upon it. The reticulum in the nucleus was first seen by Frommann in 1866, and others after him, especially in corpuscles of the connective tissue of the nerve centres, and in so called ganglion cells of the spinal cord. Heitzmann claimed that the filaments visible in the nucleus, its inclosing shell, and the filaments in the mass of protoplasm, are formations of living matter proper, whereas the meshes of the reticulum, and the interstices between the filaments, are filled with a fluid non-living substance. He based his assertions upon the direct observation of the fact, that during the motion of the protoplasmic lump the reticulum is in constant motion, and keeps changing its shape so long as the whole lump exhibits signs of life. Later observers, Strassburger, Butschli, Auerbach, Hertwig, Flemming, Klein, and a score of others, have demonstrated the presence of a filamentous structure in the nucleus, which is distinctly reticular only in the condition of rest. Most of these observers resorted to alcohol treatment, and staining methods which cleared up the bulky filaments of the nucleus only; hence a direct connection of the nuclear filaments with those of the protoplasm proper was rendered invisible, and even denied. That much, however, was made clear by these researches, that in the nucleus there is a substance capable of form-changes, of growth and of division, properties therefore, which we are accustomed to consider as attributes of life, or properly speaking, of living matter.

Beautiful, odd configurations of the filaments in the nuclei were de-

scribed, especially in the process of its division; they present a star, or sun-rays-like appearance, and were given by Fleming the not very musical-sounding name of "Karyokinesis." Heitzmann's assertion that the protoplasm likewise, at a certain stage of development, has a distinct reticular structure, is at present acknowledged as correct by many eminent histologists abroad, though the significance of this reticulum, and its participation in the process of motion and locomotion is still a much vexed question. According to these latest views, the tissues of the body are not composed of single cells, and an intervening inter-cellular substance, but all tissues form a continuous mass of living matter, which is arranged in the shape of a reticulum throughout the whole body. What formerly were thought to be individual and isolated cells, for instance cartilage corpuscles, bone corpuscles, etc., are, according to his views, points of intersection of the reticulum of living matter, the meshes of which contain a liquid in the so-called cells, and a comparatively solid glue-yielding basis substance in the basis-substance between the cells. Epithelia also were shown to be connected into a continuous mass of living matter by means of the so-called "thorns" or "prickles" traversing the horny cement substance between the epithelia. The same uninterrupted connection of the living matter has been demonstrated in muscle and nerve tissue. All these tissues being supplied with, and accompanied by connective tissue, the carrier of blood and lymph vessels. They contain isolated corpuscles, called blood and lymph corpuscles, suspended in a liquid, the plasma of the blood and lymph.

This doctrine does away with the previous cellular views and "cellular pathology." Whereas in the former cellular doctrine the animal body was composed of a large number of individual cells, resembling a rather complicated mosaic, in the present view or views of Heitzmann, the body *in toto* is an individual, and the tissues nowhere contain isolated individuals except in the blood and lymph vessels. These views of Heitzmann have largely gained ground here in America, during the last nine years, while abroad many microscopists are rather loath in accepting a doctrine directly opposed to the cell theory. Among the most prominent microscopists in Europe who agree with these new views may be mentioned, S. Stricker, of Vienna, and A. Spina, of Prague. The former demonstrated the life of the basis-substance in inflamed tissues, the latter in normal tissues of different descriptions by direct observation under the microscope.

L. Ranvier, of Paris, has recently succeeded in demonstrating the

filamentous connections of the epithelia by means of new methods, to a degree of clearness which leaves no further doubt.

Thus I have traced out the development of biological doctrines from the ancient to our modern times.

The progress made in histology has been unquestionably connected with the development of our optical means, and so far as these means have reached a high degree of perfection, so the conclusions reached in the study of histology have become more perfect and satisfactory.

I am personally convinced of the correctness of the views announced and held by C. Heitzmann, of New York. The reticular connection I have shown in my publications on topics concerning the physiology and pathology of human teeth. Let us hope that with an advancing improvement of the optical apparatus and thorough education, this new doctrine will conquer; for with the cell theory neither the structure nor the pathology of the tissues could be explained to a full satisfaction.

Stricker himself has announced his conviction. "that within the next ten years the new views are bound to replace the old fashioned cell doctrine."

DISCUSSION.

W. C. Barrett: The subject is a very important one to all who have made any study of the subject of histology. The tracing of the cell growth from the time it was first discovered by Schlieden, and the extending of it to the animal tissues by Schwann, seems to be a steady growth in the study of histology. The paper has traced the growth of the cell doctrine down so closely, that it is unnecessary to say anything; but to the thinking man, who has tried to fathom cell pathology and cell growth, there is something lacking. It has a weak point. It does not answer all the conditions. I heard Virchow talk upon this subject, and was impressed, as all who have heard him are impressed, by the earnestness of the man; but at the same time there was something lacking. What that was I did not know until I became somewhat acquainted with the doctrines of Heitzmann. Now I am not ready to subscribe to this doctrine as a whole. I have seen some men who claim to have demonstrated that he was laboring under an error; they have torn down the work that he has done, but have given us nothing to put in its place. They leave us in the same dilemma in which I found myself. The cell doctrine of Virchow does not answer the pur-

pose—does not fill the histological demands of the day ; but what have we in place of it ? That the cell is not, and cannot be the ultimate element of the cell growth, must be apparent to all who stop to enquire. We have the wall of the cell, which is structureless ; we have the nucleus, which is structureless ; we have the cellular protoplasm, which is structureless. There must be something—some structure of some kind. The demands of human reason are usually clear enough. How can I move myself unless I have some fulcrum to act upon. Without any structure, how can the amoeba change its form, any more than a drop of water can change itself. It may follow the general laws of nature, and run, as water does, down hill ; but how can it change its form ? But if you endow that with a reticulated (?) structure of some kind—understand me, I am not giving my adhesion to the doctrine of Heitzmann—but if you endow it with the possibilities of his reticulum, you can appreciate how easy it is for the cell to change its form. The doctrine of cells does not answer the demands of histological enquiry, because the cell is not an ultimate element. We have not yet reached the limit of the power of the microscope ; it does not yet reveal to us the limit of the elements of the human structure. In Heitzmann's laboratory he demonstrated to me his reticulum. I saw appearances of that character ; but I have never been able to produce it myself, although for the purpose of its study I obtained the very best objective that could be had in this country. I cannot say, then, that I am prepared to give my adhesion to the doctrine of Heitzmann, because I have never been able to produce the reticulum myself, but I submit to you the necessity of there being a structure of some kind. Our bodies are not made up of globules of water or of some structureless matter. I tell you, Mr. President and gentlemen, this is going back and grappling with the very question of life. What am I, and what are other men ? What is the difference between a live man and a dead man ? He weighs the same. The great question of this existence is, What is vitality—whence come we ? and it involves the question, Where are we going ? To a man who desires to understand the very essence of vitality, this is going down to the very root of life itself. To a man who desires to understand the great problem of existence, it is the greatest question that can engage his consideration.

W. H. Atkinson : If I were to judge of the knowledge of the origin of the tissues from the remarks made by the gentleman as a representation of the mental process through which to arrive at a just and connected comprehension of the process of organization, I should not

feel inclined to say a word, but as I have commenced I will go on. According to a table which I prepared and read before you, the first visible body is the granule, from which I said everything is purported to come. A man who has a good eye, and is willing to be educated, can establish the truth by analogical and pathological research. These scientists necessarily overstep themselves. (Coughs.) With reference to what I said in my paper, that is an example of irritation. A small particle of hyperoxidized hydrate of carbon stuck in my throat, and by sticking on the vocal chord, a little place where it did not belong, it disturbed my voice and made me cough.

W. C. Barrett: In other words, you got a frog in your throat.

W. H. Atkinson: A very small frog. I am so interested in this question that I feel a conflict in my mind as to whether it is worth while to attempt to unravel the tangled web of perception that lies at the foundation of our mental being—as though we could really touch the life of the body at all!

The whole history which has been gone over is but the report of the perceptions of men trying to get at the provable elements of the tissues; but they have not arrived at the *elements* at all. They have taken certain things and called them elements; they have combined them and given us the cell, the corpuscle, etc., but it does not help the case. We must go back of that to where energy displays itself. We can understand that there are gases that can be placed in an enclosure so that it will be full, and then two, three or four more measures of other gases can be put in the same vessel, and it will be only full then. If you ask how the glass which has been filled with oxygen gas will take in two or three other gases, we will have to reason that the molecules of the oxygen are incapable of being pressed together without space between them, and yet the other gases find a place, and they must fill in the spaces. You will say, then, that you have a solid, and you do have a comparative solid. When you put pressure on that, you can reduce it to a liquid. If you marry some of these gases which have an affinity for each other, they cease to be gases, and become liquids; and here is a good example—the formation of water from oxygen and hydrogen—which settles that question without doubt; they always marry into the proper family. Now take the cell doctrine. Beale says that the only living part of the cell is the nucleus and nucleolus; in other words, that part which has an affinity for the coloring matter, and which takes the color easily, and all outside of that mass is non-living, or dead matter. Within that mass the growth of the cell takes place.

How is that? Now, if the nucleus itself is not a complete organization capable of being seen, you may as well give up the question at once. We will call the cell a lump of matter—of jelly, and try to get at the common apprehension. We will say it is made up of the four different gases, C. H. N. O.; but the energy of these must be awakened and engaged to make them into the first form of the simplest compound body. That body we call jelly—protoplasm. I had seen the granules and strings discovered by Heitzmann, but I didn't interpret them the same. He has helped me greatly. Any one who wishes to know what Heitzmann knows has but to go and be with him a short time. There are pupils of his to-day who owe to him all that they know of histological science. When I went to him with doubtful specimens, he told what they were and where they belonged. When you hear these men who have been prosecuting their studies alone and in certain directions, and enquire of them, you come back to this question of origin of tissues. In my paper I spoke of the ripening of the molecules. Dr. Stockton thought it was not relevant to the question, and then went back on his first judgment and said it might be one of the processes by which it may grow. I purposely made a very rash statement—as it may seem, and my idea of an operation of this sort is, it lessens time—but I want to be sure I do not slip to one side or the other. Now, what is the ripening of the molecule? It is the digesting of the semen of the father and the egg of the mother, which enables them to come together and give the type which forms into the beautiful organization called a baby. These two elements were in such a condition that they were ready to be engaged and married together, so that when it came from the human ovum it would be a human being. If it were from the mollusk, it would be a mollusk. Then, as I said in my paper, they will tell you, *you* can't see it because they can't see it. Do you know, when I look at some of these assumptions there is something that stirs me up. You know when you have a lot of good fellows to speak to and to write for, there is something to stimulate you, and cause you to work better. What we need is to see how others work, discuss the subject of molecules, and corpuscles, and the different kinds of tissues which go to make up the organs, which, properly laid together, make the beautiful system called the human being, part of which is the brain, in which the ability to understand resides.

INCIDENTS OF OFFICE PRACTICE.

FIRST DAY—AFTERNOON SESSION.

Chas. Barnes: I have an interesting case. Six years ago a lady fell from her carriage, cutting her lip. Her teeth were regular, and no change was noticed for some time, but the left superior central has since gradually receded, being now more than one sixteenth of an inch above the other central. The pulp in the tooth is still living. Will some one give explanation of the change?

Another case, of which you have the model, presents a peculiarity in formation of the entire inferior denture. The gentleman is about forty years of age, and the teeth have never been much longer than is shown. They are quite small, of a dark color, and many of them present no signs of enamel.

W. H. Atkinson: How are the upper teeth?

Chas. Barnes: He wears a full upper plate. He is the only one of eight brothers thus affected. For several generations back there has been one in the family with this peculiarity. I should like to ask the advisability of an extended crowning operation in such a case.

A child, thirteen years of age, came to me with severe toothache. Examination revealed teeth all in perfect condition, with inferior twelve year molar erupting. The anterior buccal cusp was just protruding through the gum. I pressed cotton under the gum for examination. Second day, no better. Renewed the cotton, and made a soothing application. The third day the gum was sufficiently tented back to examine fissures with an explorer, which revealed a large cavity. Preparations were made for filling, but at the first touch of a fissure drill the entire cusp came away. There was no sign of decay, and no dentine in the body of the tooth; it was merely a shell of enamel. The tooth was then filled with gutta percha, and has since given no trouble. Has any gentleman present had or seen such a case?

FIRST DAY—EVENING SESSION.

A. H. Brockway: Talking with a well-known dentist of New York a short time since, he said to me, "Do you ever use gold and amalgam in the same cavity?" From his manner in putting the question I saw that he had doubts as to the correctness of such practice, but I replied, "Yes, I sometimes do; what then?" "Well," he answered, "I have never yet done it, though I have at times felt that it was the only thing I could do, but I have feared that it might produce galvanic disturbance." I told him that I had never yet seen any such result. I speak of this now because it is possible there may be others still holding the opinions of this gentleman, as I think to their detriment. The practice of combining gold and amalgam in filling certain cavities *ab initio* has been advocated in this society by an eminent practioner, and I doubt not has been followed by others of us in extreme cases, but it is in the repair or *guarding* of gold fillings at the cervical margin where amalgam is most frequently employed in this combination. I judge that it is not infrequently so used by many of the best practioners. For my own part I can say that I have found nothing that has served me in such cases so satisfactorily as amalgam, and I have used it in this way for several years without observing the slightest injurious effects; nay, I am of opinion that so used it exerts a preservative effect beyond what either material would used singly.

S. B. Palmer: I had occasion some time ago to fill a proximal cavity in which it was hardly admissible to use amalgam, because with the gold filling it would be likely to produce some disturbance; and to use gold filling only was impossible, because of the soft nature of the tooth; so I did what I had often done before—I took a sheet of gold foil and manipulated it till I had rendered it kid-like, and used that, finishing it with cohesive gold. Since then I have lined cavities with this prepared filling, and found it to work excellently. Sometimes in porous teeth I would use amalgam.

W. C. Barrett: My practice has been to tear down and build up again, which I believe to be the safest way. This cobbling I have not practiced very much; it is lost labor. By patching them up you perhaps make them substantial for a time, but the whole thing is necessarily weak. I have never patched gold filling with amalgam; I sometimes have with gutta percha.

And now I would like to call your attention to another thing. But

a short time ago I filled two bicuspid's upon proximal surfaces, and after they had been filled they greatly annoyed the patient. He complained of an odor arising from between the two teeth which had been filled. I said there was probably a little laceration of the soft tissues, and dressed it with a little chloride of zinc; but the annoyance continued, and he came to me but a few days ago with the alveolar septum which had sloughed off. There was necrosis of the alveolar tissue probably, but induced how? I presume by the cotton which I had used as a stopping. I had crowded away the gum, and that had resulted in this trouble. I do not think the man will lose his tooth, but it has taught me a lesson, and that is, not to use cotton about the confluence of the soft tissues of the gum and the alveolar process.

A Member: I had a case similar to that mentioned by Dr. Barrett. I found when I came to examine it that the same effect had been produced by the use of arsenous acid applied by myself—had destroyed the septum, and the alveolar process came away. Now, whether that was done by the arsenous acid or by pressure is a question. I relate this as an incident of office practice.

A. H. Brockway: I do not know that Dr. Barrett's remarks should be considered as a sort of reflection upon those whose practice has been described in my former remarks, but I can say for myself that I believe in doing whatever is to be done as thoroughly as possible. I would be as unwilling as any one to resort to "patchwork" with a view of temporizing; but my observation, extending over a period of more than twenty years of practice, has taught me that in the cases I have mentioned—where decay has set in at the cervical margin of large gold fillings, especially in proximal cavities of bicuspid's and molars—not even the radical removal of the affected filling, and refilling the cavity with gold in the best manner possible for the highest skill, will secure such lasting results as the more simple treatment I have indicated.

N. W. Kingsley: I want to say one word about Dr. Barrett's "cobbling." He says he has never tried such a method. Then I do not wonder he has not faith in it. If he had, he would have faith. I have seen many cases coming from the hands of the best operators; large cavities in proximal surfaces of back teeth involving more or less of the grinding surface, filled with gold as well as could be by human hands, and yet, if you examined them critically, you would find in a majority of cases a giving away at the cervical border. Now if Dr. Barrett had such a filling in his tooth, and was willing to have all that gold pulled

out, and a new superstructure built up from the bottom, with the probability that the same trouble would occur again, and also that the tooth would be injured in the taking out of the filling—if he wants it done to his tooth, and can find any one to do it, no one will object. But if such an one was in my mouth, I wouldn't have it done for any inducement. I would say: Remove the decay as well as you can, but do not disturb the gold filling.—“cobble” it with amalgam, for I am certain that such process will preserve the tooth, and I am not certain that an entirely new filling will.

Speaking about filling with gold and amalgam, you will remember that I described this method before this Society many years ago (*Transactions for 187*, p. 00). I have always done it, however, with a kind of reluctance, because I had been taught never to use anything but gold; but I can say, in all candor and sincerity, that I have never known one of these fillings to need re-filling. The amalgam portion may discolor, but the filling will preserve the tooth. I have never used such method for teeth anterior to the bicuspids. If the spaces between the teeth are narrow, I would use some kind of a wedge. Frequently a piece of a thin file will serve the purpose. The cavity may be filled one-third or one-half with amalgam, mixed as dry as can be worked, and the gold filled into it. The first gold will take up the excess of mercury, and the whole operation can be finished at one sitting.

A member: Will not the filling turn black.

N. W. Kingsley: Yes, sir; amalgam will turn black.

Frank Abbott: I know very well from what I have seen that the kind of filling spoken of by Dr. Kingsley will save teeth; but I have often thought I would like to ask somebody who knows more about it than I do, why it is that this excessive oxidization takes place. In such cases the filling becomes as black as your coat, while the same material in a different part of the same mouth undergoes no change. It is claimed, I believe, that no electric current is produced.

W. C. Barrett: I would like to suggest the use of tin, or some of its preparations—Robinson's, for example.

S. B. Palmer: It is a well known principle, that when two metals are placed in an unstable fluid, if they are subject to the decomposing effect of the fluid, these two metals or elements will arrange themselves positively and negatively: that when placed so as to leave a

space between, an electric current will be the result ; that when the two plates are placed together, as the two elements of a battery, there will galvanic action go on. The reason of the greater oxidization is because the gold is negative, and the amalgam positive. The oxidization takes place upon the amalgam, as shown by its turning black ; and it is better, because this action fills the dentine with a metallic substance which renders it negative, and then there is no action between it and the dentine. Do not understand me to say that the tooth bone is positive, because, as a whole, it is not. It is positive in this sense : if there is decomposition going on, the formation of an acid takes place, and the animal portion only is positive and becomes an element in the battery. If you can protect the softened dentine by insulation, the surface of dentine already acted upon becomes filled with lime salts. Thus the action ceases. I think this is perfectly clear, and in accordance with a well-known law. It increases the action upon the amalgam, and in proportion as the gold is negative, the other becomes positive, and the greater the oxidization upon the surface the less the galvanic current,—the same as with old silver plates, which sometimes turned black. There was less annoyance when they were black than when they were clean. The reason was there was no galvanic action between the two, and it is very much lessened by the oxidization.

A member : I think I was once present when Dr. Kingsley made a statement in regard to the use of gold and amalgam in the same cavity. It seemed to me then to be a little bit of heresy, but I have since given the matter some little thought. I gave the method a trial about that time, and was very much pleased with the manner in which I could pack gold over amalgam. Since then I have been using Robinson's preparation for lining the cervical portion of the cavity, and it works admirably. There is no trouble whatever in packing gold over tin, and the tin certainly adapts itself better to the cervical walls of the tooth.

APPENDIX.

OFFICERS.

L. S. STRAW.....	<i>President</i>	NEWBURGH.
FRANK B. DARBY.....	<i>Vice-President</i>	ELMIRA.
J. EDW. LINE.....	<i>Secretary</i>	ROCHESTER.
H. G. MERICK.....	<i>Treasurer</i> ..	BROOKLYN.
W. H. ATKINSON.....	<i>Correspondent</i> ..	NEW YORK.

CENSORS.

N. W. KINGSLEY, <i>Chairman</i>	NEW YORK.
WM. JARVIE, JR.....	BROOKLYN.
S. D. FRENCH.....	TROY.
W. H. COLGROVE.....	JOHNSTOWN.
S. B. PALMER.....	SYRACUSE.
A. M. HOLMES.....	MORRISVILLE.
F. FRENCH, <i>Secretary</i>	ROCHESTER.
A. P. SOUTHWICK.....	BUFFALO.

COMMITTEES.

Arrangements—W. F. Winne, E. C. Baxter, C. F. Rich.
Publication—J. Edw. Line, F. French, W. C. Barrett.
Ethics—O. E. Hill, C. E. Francis, L. E. Ireland.
Business—M. E. Elmendorf, J. J. Pitts, W. H. Colgrove.
By-Laws—J. H. Holly, A. P. Burkhart, Nelson B. Gregory.
Prize Essays—C. F. W. Bödecker, C. A. Woodward, A. H. Brockway.
Dental Law—Wm. Carr, A. M. Holmes, A. M. Wright.
Codification of Dental Law—N. W. Kingsley, F. Abbott, J. E. Dexter.
Dental Practice—B. Rathbun, G. W. Hoysradt, Myron D. Jewell.
Transactions—A. N. Priest, E. L. Swartwout, C. C. Smith.
Diagram of Incisor Tooth—Frank Abbott, C. E. Francis, S. G. Perry.
Preceptor and Pupil Contract—W. C. Barrett, O. E. Hill, Wm. Jarvie, Jr.
Formation of National Association—J. G. Ambler, O. E. Hill, S. B. Palmer.
Delegates to American Dental Association—E. Parmly Brown, Norman W. Kingsley, R. Stanbrough, L. S. Straw, J. G. Ambler.

PERMANENT MEMBERS.

Ambler, J. G.,	New York	Kingsley, N. W.,	New York
Ames, F. L.,	Albany	Lamb, Geo. E.,	Port Henry
Allen, J.,	New York	Line, J. Edw.,	Rochester
Atkinson, W. H.,	"	Marvin, C. A.,	Brooklyn
Barnes, C.,	Syracuse	Mason, B. T.,	Phoenix
Barrett, W. C.,	Buffalo	McGregor, B. R.,	Albion
Baxter, E. C.,	Albany	Mensch, C. E.,	Brooklyn
Bödecker, C. F. W.,	New York	Merritt, C.,	New York
Bogue, E. A.,	"	Miller, C.,	"
Bronson, W. A.,	"	Mirick, H. G.,	Brooklyn
Brockway, A. H.,	Brooklyn	Nellis, F. D.,	Syracuse
Carr, Wm.,	New York	Northrop, A. L.,	New York
Chapman, A. N.,	Brooklyn	Palmer, S. B.,	Syracuse
Colgrove, W. H.,	Johnstown	Perry, S. G.,	New York
Colton, A.,	Hudson	Pitts, John J.,	Brooklyn
Cook, C. D.,	Brooklyn	Priest, A. N.,	Utica
Crandall, C. P.,	"	Race, J. N.,	Brooklyn
Daboll, G. C.,	Buffalo	Rathbun, B.,	Dunkirk
Dwinelle, W. H.,	New York	Rich, C. F.,	Saratoga
Elliott, W. S.,	Goshen	Rogers, L. W.,	Utica
Elmendorf, M. E.,	Brooklyn	Shannon, W. P.,	Brooklyn
Francis, C. E.,	New York	Sloan, P.,	Canajoharie
Freeman, S. A.,	Buffalo	Southwick, A. P.,	Buffalo
French, F.,	Rochester	Stacks, C. E.,	Glens Falls
French, S. D.,	Troy	Stillman, S. L.,	Greenwich
Harreys, C. W.,	Brooklyn	Straw, L. S.,	Newburgh
Harvey, C. W.,	Buffalo	Tripp, G. W.,	Auburn
Harvey, L. F.,	"	Van Vleck, C. K.,	Hudson
Hill, O. E.,	Brooklyn	Winne, W. F.,	Albany
Holmes, A. M.,	Morrisville	Woodward, C. A.,	New York
Ireland, L. E.,	Oneonta	Wright, Albert M.,	Troy
Jarvie, Jr., Wm.	Brooklyn	Young, O. R.,	Troy
Jewell, Myron D.,	Richfield Springs		

DELEGATE MEMBERS.

As reported by Committee of Arrangements.

1881.

Abbott, F.,	New York	Elmendorf, C.,	Penn Yan
Allen, W. H.,	"	Holly, J. H.,	Warwick
Barrows, W. A.,	Buffalo	Ireland, L. E.,	Oneonta
Collins, J. H.,	Granville	Nellis, F. D.,	Syracuse

1882.

Brown, E. Parmly,	Flushing	Pitts, John J.,	Brooklyn
Curtis, I. C.,	Fulton	Rhein, M. L.,	New York
Gregory, N. B.,	Unadilla	Rosa, Hyman,	Kingston
Knickerbocker, H. C.,	Seneca Falls	Smith, M. H.,	Penn Yan
Line, J. Edw.,	Rochester	Stewart, W. C.,	Elmira
Odell, F. M.,	New York	Wright, A. M.,	Troy

1883.

Butler, C. S.,	Buffalo	Ingalls, C. E.,	Courtland
Darby, F. B.,	Elmira	Mason, B. T.,	Phoenix
Dexter, Jas. E.,	New York	Rich, A. C.,	Saratoga
Dubois, T. W.,	Poughkeepsie	Rich, C. F.,	"
Hall, H. A.,	Troy	Smith, C. C.,	Syracuse
Hoysradt, G. W.,	Utica	Swartwout, E. L.,	Utica
Hudson, R. N.,	Auburn		

1884.

Burkhart, A. P.,*	Dansville	Jewell, Myron D.,	Richfield Springs
Gregory, N. B.,	Unadilla	Mills, James J.,	Poughkeepsie
Ives, Chas. F.,	New York	Walker, W. W.,	New York

* In place of R. N. Hudson ('83) resigned.

HONORARY MEMBERS.

Abbott, F. P.,	Berlin, Prussia	Hunt, R. F.,	Washington, D. C.
Burridge, L. S.,	Rome, Italy	Knox, H. E.,	San Francisco, Cal.
Cartwright, S. H.,	London, England	Maynard, E.,	Washington, D. C.
Crane, J. W.,	Paris, France	Miller, W. D.,	Berlin, Prussia
Dodge, Jr., J. S.,	New York	Nash, S. M.,	New York
Evans, T. W.,	Paris, France	Seabury, F. N.,	Providence, R. I.
Hastings, C. A.,	Rio Janeiro, Brazil	Waite, W. H.,	Liverpool, England
Horne, W. C.,	Rome, Italy		

MASTERS OF DENTAL SURGERY (M. D. S.).

Allen, C. C.,	Brooklyn	Howard, F. E.,	Buffalo
Allen, C. F.,	Newburgh	Howe, J. M.,	New York
Allen, H.,	Gloversville	Jarvie, Wm., Jr.,	Brooklyn
Ambler, J. G.,	New York	Jarvis, O. A.,	New York
Barker, De Witt,	Brooklyn	Kingsley, C.,	Paris, France
Barrett, W. C.,	Buffalo	Kingsley, N. W.,	New York
Biddle, C. H.,	Brooklyn	Kraemer, Jr., F. O.,	Brooklyn
Bodecker, C. F. W.,	New York	Line, J. Edw.,	Rochester
Brewster, R. C.,	Brooklyn	Maynard, J. D.,	Paris, France
Brookway, A. H.,	"	*McCall, S. H.,	Binghamton
Bronson, W. A.,	New York	Mensch, C. E.,	Brooklyn
Burkhart, A. P.,	Dansville	Miller, C.,	New York
Burras, T. H.,	New York	Mills, J. J.,	Poughkeepsie
Campbell, W. A.,	Brooklyn	Mirick, H. G.,	Brooklyn
Cartwright, S. H.,	London, Eng.	Moore, F. W.,	"
Colton, A.,	Hudson	Morris, N. C.,	Somerville, N. J.
Converse, J. A.,	West Troy	Nash, S. M.,	New York
Cook, S. F.,	Brooklyn	Nellis, F. D.,	Syracuse
Curtis, I. C.,	Fulton	Northrop, A. L.,	New York
Daboll, G. C.,	Buffalo	Palmer, S. B.,	Syracuse
Davenport, I. B.,	N. Adams, Mass.	Perkins, J. A.,	Albany
Davenport, S. E.,	Northampton, "	Perry, F. E.,	Norwich
Dexter, J. E.,	New York	Priest, A. N.,	Utica
Dixon, F. B.,	"	Rathbun, B.,	Dunkirk
Dodge, W.,	"	Reed, J. H.,	New York
Doty, A. W.,	Windham	Rich, C. F.,	Saratoga
Doty, W. K.,	"	Rider, W. H.,	Danbury, Conn.
Dabar, C. L.,	New York	Rosa, Hyman,	Kingston
Elliott, W. S.,	Goshen	Russell, J. W.,	Brooklyn
Emens, G. V.,	Hannibal	Southwick, A. P.,	Buffalo
Francis, C. E.,	New York	Stainton, C. W.,	"
Frazee, L.,	Brooklyn	Straw, L. S.,	Newburgh
French, F.,	Rochester	Taggart, J. E.,	Westport
French, S. D.,	Troy	Taylor, F. E.,	Malone
Fuller, D. J.,	Brooklyn	Van Vleck, W. B.,	Hudson
Fuller, E. D.,	Peekskill	Waid, A. J.,	Gouverneur
Gifford, J. C.,	Westfield	Walker, F. C.,	Brooklyn
Hall, L. M.,	Rome, Ga.	Walker, W. W.,	New York
Hanks, E. F.,	Jersey City, N. J.	Walter, J. S.,	Rochester
Harvey, L. F.,	Buffalo	Wilcox, D. F.,	Catskill
Hawes, A. C.,	New York	Wilder, L. G.,	Brooklyn
Hayes, W. C.,	Albion	Wilmott, J. B.,	Toronto, Ont.
Hill, O. E.,	Brooklyn	Wright, A. M.,	Troy
Hitchcock, T. S.,	Germany		

* Deceased.

TEETH AND BRAINS.

According to Mr. Spence Bate, an English scientific person, the coming man will have no teeth. He alleges that as man advances in development the teeth are gradually evolved into brain matter. This will continue to take place until the time will come when our teeth will be entirely converted into brain, and we shall be compelled either to change our diet or to depend wholly upon false teeth.

It is comforting to know that our brains grow at the expense of our teeth, for we can thereby reconcile ourselves to the prevailing paucity of teeth among Americans. So frail and incapable of prolonged service are American teeth that our dentists have been able to gain the unequalled professional experience that has made them the best dentists in the world. Of course, the meaning of our failure as a teeth-producing people is that we convert them into brain with exceptional rapidity. The more brains a people possesses the fewer teeth they have, and Mr. Spence Bate, were he to examine a thousand American mouths, would unhesitatingly confess that Americans surpass all other nations in the quantity of their brains.

If the coming man finds himself without teeth—as we are told that he inevitably will—it is impossible that he will long adhere to the custom of wearing false teeth. Rather will he frankly acknowledge that he is a toothless animal, and proceed to make the best of his situation. He can, of course, subsist exclusively upon semi-liquid articles of diet; or, in other words, upon what Mr. Logan, with his fondness for Spanish idioms, calls “spoon victuals.” There are many animals which thrive upon this sort of diet, and man can undoubtedly add himself to the number. It is more probable, however, that the coming man will consider the disappearance of his teeth as a hint to him to abandon the clumsy and tedious practice of eating, especially since, by so doing, he can save a great deal of time which he can devote to productive industry.

Why should not the coming man be nourished by hypodermic injections? In this way he could dispense not only with teeth but with his whole stock of digestive organs. Why should a man trouble himself to keep a stomach, a liver, and a number of other elaborate organs, all of which must be kept in repair, or serious consequences will follow? The cost of repairs to the liver alone, in the case of a man living in a malarial region, is a very heavy item, and in many cases

it may safely be said that it costs a man more to keep his stomach in operation than the result is worth. If we can be nourished with hypodermic injections—and there is little doubt that before long this will be entirely feasible—wisdom will dictate the abandonment of our digestive organs. These will in a short time become merely rudimentary, or will entirely vanish, and their place in the human body will be occupied by the heart and lungs, which will be so greatly enlarged as to take up the entire space once reserved for other organs.

Thus we see the conversion of teeth into brain will finally result in making man independent of his digestive organs and increasing the size of his heart, his lungs, and his brain. Such a man will be far superior physically to the present style of man. The college student of the future will be able to row twice as long and twice as fast as at present, and the six-day pedestrians will find it as easy to make twelve hundred miles a week as it now is to make six hundred.—*New York Sun.*

EARLY DENTISTRY HEREBOUTS.

With all the improvements of the last fifty years the science of dentistry is yet in its youth, and the coming fifty years will undoubtedly develop still greater improvements. Rochester has kept pace with all these improvements. And what is true of dentistry in other places is true here. In early days the physicians extracted most of the teeth, always carrying in their pill-bags a pair of turnkeys for this purpose. A directory of Rochester, published in 1827, does not mention a dentist, so it is fair to conclude that there were none here at that time. I include to the opinion that Dr. Bigelow was the first man to practice dentistry in Rochester, doing his work at the hotels, where he stopped. He was well known at the old Eagle Hotel, and in various towns in Monroe county, as well as other parts of Western New York. He was a man of fair ability for the time. Some of his work stood for over twenty years. Dr. S. W. Jones came a little later, as an itinerant practitioner. Without doubt, Dr. L. K. Faulkner, who died last autumn, was the first settled dentist here; he had not practised dentistry for some years previous to his death. Dr. H. N. Fenn, who was a graduate in medicine, and had been a druggist, opened an office in this city for the practice of dentistry, about the year 1840. When I came to Rochester, in 1847, there were here Drs. Faulkner, Fenn,

Haines, Beers, Mills, Wanzer, Proctor, Allen, and perhaps one or two others, whose names I do not now recollect. Others were studying, who soon after commenced practice. Of all those who were here then all are dead except Dr. Proctor and myself. From that time until the present the number of dentists in the city has increased, until there are now about thirty-five—enough to do the work for a population of 200,000,—WILSON, *Semi-Centennial History of Rochester*.

GELATINE PAPER DRY PLATE.

Those of our readers interested in photography, which we have reason to believe not a few of them prefer to fishing or shooting, will read the following account of a visit to the Eastman Dry Plate and Film Company's place with pleasure and, ultimately perhaps, with profit.—L.

They have invented a process by which a sensitive gelatine film is placed on paper instead of glass, and which can be used for the same purposes and in the same manner as the gelatine film on glass has been used for the past five years. By exposing this filmed paper to the light, just as the dry plate is now exposed, an image is immediately stamped upon it. The filmed side of the paper can then be placed on a glass and the image transferred to it with perfect accuracy and completeness. From the transferred image on the plate photographs can be printed, or the image can be re-transferred to a heavier plate, made entirely of galatine, from which photographs can also be printed. * * *

Passing from these various rooms the writer was ushered into a recently equipped room where stands the machinery used to place the sensitive film on paper. There stood a simply constructed apparatus through which a continuous roll of paper was passing at the rate of thirty feet a minute, and upon one end of which the gelatine film was being evenly and smoothly spread. This filmed paper was being prepared faster than 100 employes could prepare an equal surface of glass, to say nothing of the great difference in the cost of the articles used. The regular photographic gallery of the establishment was next visited, where were shown as clear and perfect photographs as one would wish, taken from the new paper film.

"What are the advantages of the invention?" Mr. Eastman repeated after the reporter.

"Well, in the first place, we do away entirely with the use of glass in the manufacture of paper film, and we get a much better article than the dry plate, because we can coat the paper uniformly. Another great advantage is the portability of the paper film. You see it is flexible. It can be sent out wound on spools, and there is no chance for breakage. Twelve paper film pieces occupy one-eighth of an inch space in thickness, whereas twelve glass dry plates require one and a quarter inches of space, and the weight of the former is only one-fiftieth that of the latter."

"Can your paper film be used in the ordinary apparatus of photographers?"

"Certainly. They need not get a single new instrument; they can use the same cameras, lenses, and, in fact, they can use up the old glass that has accumulated since they commenced to use dry plates. By transferring the image on the paper film to the glass, they virtually have a dry plate negative produced upon their own glass; so you see that it combines both convenience and economy.

"And the price?"

"Oh, yes. The price of the paper film will be greatly cheaper than the old dry plates, and then there will be the great saving in freight. I can send to San Francisco for one cent paper film that will do the work of as many glass plates as could be sent for 43 cents, and without as much expense for packing or danger of breakage.

"This will delight the amateurs, won't it?"

"It can't be otherwise. Let me show you this little self-registering machine all ready to put into a camera. There you see two spools of paper film. As fast as one unwinds the other winds up. That thumb-screw enables the operator to turn the paper along as fast as he wants to use it, and thus take fifty distinct photographs on the one spool of paper film. The whole machine weighs two and three-quarter pounds. A corresponding amount of glass plates and holders would weigh fifty pounds."

"A good contrivance for scientists."

"Yes, any person can go out and take fifty photographs in an hour or less. He can then quietly keep his selection in his pocket until he gets ready to choose such as he wants to transfer to a glass plate and print."

"It looks as if the glass plates must go."

"Nothing could be more certain. Glass is fragile and expensive. This paper film does the work better, is cheaper, and is infinitely more convenient. It is in fact to photography what a Webb perfecting press is to journalism, because it supplies a want no other device can meet."

MIRACLES OF MIND.

The abolition of bodily pain, induced without drugs and by physical means alone, is a most interesting and important fact, but lack of time forbids more than a passing notice. I will give you only one illustration. You will remember that a few months ago, in spite of the keen eye of our local policemen of the heavens, an æsculapian comet struck this city. It was heralded by a brass band and a troop of lackeys in livery. North St. Paul street received the primal shock, and there most of the damage was done. A large tent was pitched under which many miracles were wrought, if we are to accept the testimony of eye witnesses. Not least among these wonders was the extracting of bushels of teeth without pain. Day after day hundreds of refractory molars were shelled out in the most common-place way, and yet the proprietors of those molars affirmed upon their honor that they had no pain. Many outsiders were skeptical, others believed. I believed, and for this reason; I know that when the brain is busy with the commingled emotions of fear and wonder, coupled with a certain degree of expectation, that it is illy conditioned for taking cognizance of impressions of pain. And I see in the surroundings referred to, first the conditions favorable to inducing this state of mind. The victim was invited to be seated on a high rostrum in full view of thousands of eyes, which is of itself sufficient to paralyze a novice. He took his place there because he confidently "expected" a painless operation, else he would not have gone. Immediately he had taken his seat, the band struck up, the crowd hooted. In the twinkling of an eye the forceps were inserted, and in a jiffy the ex-proprietor of the offending bone stepped down and out to scatter the tidings of great joy.—DANN.

From the fly-leaf of a book printed in 1703-4: "The works of John Oldham, &c., who ought to have worked at something else."

CONDUCTORIAL.

COCAINE HYDROCHLORATE.

At the meeting at which was read the article on page 175, Dr. Frank French, in the course of the discussion, made the following statement, which is certainly of great value as a contribution to the history of this newly introduced drug :

In 1865 a family by the name of H——— became patients of mine, who had resided for a number of years in the city of Mexico, leaving there about 1860. The mother, a woman of unusual intelligence, and remarkably well informed on the subject of dentistry, told me at that time that having occasion to employ a dentist some time before leaving Mexico, she went to what was considered the best, who was a colored man. Her teeth were very sensitive, and he proposed to make an application to remove the sensitiveness. She at first objected, fearing it might injure the teeth. He assured her that sensibility would be entirely removed for several hours, and then the tooth would return to its normal condition. It was applied in the form of a dark-colored paste to the cavity, sealed up, and allowed to remain 24 hours, when the tooth was excavated and filled without the slightest pain, and after several hours regained its normal condition. She was delighted with it, and had several teeth treated in the same way with the same result. On leaving Mexico she went to him and tried to induce him to tell her what it was, He refused, saying it was a secret, but that it was made from a plant growing either in the West Indies or South America. He, however, let her have some of the preparation, and while in New Orleans she took it to Dr. Brocklebank, a well known dentist, and told him about it. He was very incredulous at first, but, at her solicitation, tried it, and was surprised and delighted with the results. He took it to a chemist, had it analysed, but all that he could ascertain was, that it was a vegetable substance. In conversing with her within a few days, she said that since Cocaine has been brought out, she had said to her husband that possibly that might have been some preparation of it.

Acting on his suggestion we have made a paste in the form of a glycerine solution (glycerine 1 part, saturated solution of cocaine hydrochlorate 1 part), and applied it on punk, covering the punk with a Weston cavity cap, and that with gutta percha. Twenty-four to forty-

eight hours obtunds the sensitiveness of dentine completely, and enables one to do painlessly what before was seemingly impossible. Applied in the same form to exposed pulps, one can, in many cases, extirpate them with little or no pain, an operation that we had attempted in three cases (but without success) with a two per cent to a saturated solution, consuming ten to thirty minutes of valuable time. The rubber dam is an indispensable adjunct in the successful use of cocaine hydrochlorate.

WALL'S FOCUSING DEVICE.

While making a call at the Bausch & Lomb optical works a few weeks ago, we were shown a sketch, on the margin of a letter from Dr. Otto A. Wall, of the St. Louis College of Pharmacy, of an Atwood photo micro camera (the same as figured in our October issue), with an addition that facilitates accurate focusing of the image of highly magnified objects. As is well known to those who have tried their hand at making photo-micrographs, the ground glass focusing screen cuts the image to powder, and therefore renders delicate work difficult of performance. Other devices, of which there are many, are either complicated or consume too much time. Dr. Wall's improvement consists of a screen of porcelain in place of the ground glass, or fitted for the time being to the plate-holder, and a little door in the side of the camera-box midway between the top and bottom, and about four inches from the back end. By looking through the hole or door in question, the image is seen by reflection on the white and smooth surface of the porcelain. White paper (which we have used in the absence of porcelain) may be used in place of the porcelain, fixing it to a plate in the holder, or pasting it to the inner surface of the ground glass. The hole in the box may be plugged during the exposure of the plate by a cork, or covered with black cloth. We take the liberty of christening it as above.

THE "RECTIGRAPHIC."

Are you about to invest in a first-class photographic lens? Are you dissatisfied with the one you now own? In either case do not fail to correspond with the Gundlach Optical Company of this city before making a permanent investment even in a Dallmeyer or a Ross. The above company's "Rectigraphic" works up to both of those named, and in several instances has crowded them to the wall.

UNIVERSITY OF CALIFORNIA.

The commencement exercises of the dental department of this institution were held at the California Theater, San Francisco, Tuesday evening, November 11th. The following received the degree of D.D.S.: Geo. W. Coal, John M. Dunn, Archibald D. Gleaves, Robert Nicol, Gustave C. Rietzke, William H. Simmons, Elmer S. Weldon. The address on behalf of the dental department was delivered by Prof. W. E. Taylor, M. D.; the degrees were conferred by Pres. William P. Reed. We acknowledge, with thanks, an invitation to be present.

THE "SHANTZE" IMPROVED.

The Bausch & Lomb Optical Company have recently completed six "Shantze" microtomes, with improvements. Our April number will contain cuts and a description of the machine, with special mention of important changes and additions.

CHICAGO!

The Chicago Dental Society did itself proud in entertaining its friends at the late annual dinner. Barrett, Kingsley, Daboll and others, have not yet recovered from the effects of their visit. To leave town and live, or stay a day or two longer and be *feted* to death, were the horns of the dilemma they were compelled to struggle with. They left, wherefore they live. We acknowledge an invitation to be present, with which circumstances, however, made it impossible for us to comply.

PELLETS.

How to tell a mad dog—Talk to him.

She wanted a tooth brush suitable for a spare room.

Chloric ether, and not sulphuric, is the better solvent of iodoform.

The Department of Biology of the University of Pennsylvania was formally opened Dec. 4th. Dr. Joseph Leidy is director.

Old year and new year degrees of comparison—Positive, die; comparative, diary; superlative, dire reality.

A boy's composition says: "Onions are vegetables that make you sick when you don't eat them yourself."

Patient—Is ze cavity in ze up-stairs toose?

L. D. S. I.—Be jabbers it is.

The dentist was a Frenchman.

A Philadelphian firm advertises—"Cholera Germs, or the 'comma bacillus,' will soon be in stock." Equivocal, but true as prophecy after fulfilment.

"What a lovely little dog," exclaimed a Boston girl at the dog show. "Is it an Expectoration?" "No, ma'm, it's a Spitz." She hurried up to the station, and took the first train for home.

The full-page plates contained in this number, and those to follow in the number for April, were made from drawings by a local artist by the Moss Engraving Company of New York. They're a credit to all concerned.

The following modest statement of a profession appears on the walls of a Montreal hotel: W. Hill, tonsorial artist, physiognomical hair-dresser, facial operator, cranium manipulator and capillary abridger. Hair cutting and shaving with ambidexter-facility.

He—"You had a very narrow escape last night, Miss Julia."

She—"Mercy, what do you mean?"

He—"Well, you see, I had a dream about you. I thought I was just about to kiss you, when the Chinaman rapped at the door, and I woke up."

She—"The Chinese must go."

Thirty-five members of the 7th and 8th Societies (not counting the rat in the north-east corner) sat or stood for their photograph, and a right good picture it is. To members of other district societies who would know the style of beauty that characterizes members of the 7th and 8th, it is worth ten times its cost, or thereabouts. Bowdish & Hoagland, however, will furnish copies at \$2.00 each.

CAULK'S DENTAL ANNUAL FOR 1885.—The annual for the current year will contain a directory of nearly 100 dental societies, a list of dental periodicals, full information as to State dental laws, dental colleges, dental necrology, and dental patents. It will contain also original articles by Drs. D. R. Stubblefield, G. L. Parmele, M. M. Levett (Paris), J. B. Hodgkin, W. Geo. Beers, J. E. Cravens and Louis Ottofy. It should, and undoubtedly soon will be in the hands of every live dentist.

Dr. L. W. Bristol's "Personal Recollections," as published in the *Independent Practitioner* for December, is on its travels, and it deserves to go a long way. The doctor is well on in years, but his usefulness will end only when he dies. As in the past, so for many years to come, may he enliven the meetings of 7th and 8th.

Aha! Oho! Hum hum! Look here!
 I'm the merriest sort of a bank cashier!
 My course is finished; my race is run;
 My trunk is packed, and my work is done.
 I've scooped the funds, and I truly believe
 That the time has come for me to leave.
 I skip;—I run;—I travel;—I fly;—
 A fugitive bank cashier am I.—*Life*.

The *Church Union* says--

"The Presbyterian Synod of South Carolina, by a slender majority, has passed a resolution which will compel the Rev. James Woodrow, D. D., LL. D., Professor of the Relations of Natural Science to Revelation, in the Columbia Theological Seminary, either to modify his teachings concerning the simian origin of man, or resign his professorship."

The Professor wouldn't "modify," and having but one other alternative, he resigned. To "modify" was to conceal a part of the truth, which the Professor was too good a Christian to do. If he had taught the "Synod's Notions of the Relations of Natural Science to Revelation," he would have got on swimmingly, and thereby saved his place, but at the expense of his conscience. It strikes us as strange, indeed, that such a thing should be when great and good men like Professor Asa Grey, the eminent botanist, not only find no difficulty in reconciling science and religion, but welcome, as God's word, the fundamental teachings of Christianity and the doctrine of evolution.

MICROSCOPICAL.

Hæmachromometer—An instrument for comparing for color, side by side in the same field, two samples of blood.

Hæmacytometer—An instrument for counting, or facilitating the counting, of blood corpuscles.

The Microscope continues as bright and newsy as ever, and, for one dollar a year, is the cheapest periodical of the kind extant. Ann Arbor is its home.

To those of our readers who visit New Orleans this winter, we say: Do not fail to call on Mr. A. B. Leckenby, in charge of the optical exhibits from firms in Rochester. He's a genius, and an odd one too.

The microscope objective made for Prof. Wm. H. Rogers, of Cambridge, Mass., and described by Mr. Ed. Bausch on page 101 of the October number, has been tested and delivered. For the reading of fine rulings it is all that could be desired, which was the primary object kept in view in its manufacture.

At the session of the Royal Microscopical Society, held Oct. 8th, at King's College, Strand, W. C., President W. H. Dallinger and Councilman A. W. Bennett, made a report as representatives to the American Society of Microscopists, which met in this city in August last. Both spoke appreciatively of their reception and entertainment here, and at the close of the report a vote of thanks to Americans was carried by acclamation.

BOOKS, PAMPHLETS, PERIODICALS.

NOTES ON DENTAL PRACTICE. By Henry C. Quinby, L. D. S. I., etc. Philadelphia: S. S. White Dental Manufacturing Co., 1884, Pp. 202.

The concluding paragraph of the author's preface is as follows: "There is, however, much yet to be learned; and the teachings of experience, as well as the researches of trained scientists, being valuable to the student, it becomes the duty of those who have seen much practice to make its lessons known to the profession, and thus add as much as possible to the available knowledge. This, therefore, must be my excuse for publishing these notes."

The author has evidently "seen much practice," and in placing these notes at the disposal of the profession has performed well what he regarded as his duty. Many of them have appeared at other times and in other places from his own pen, and that of other writers on dental topics, while many more appear herein for the first time. He is a practical man; ingenious, inventive, and mechanical; and writes directly and intelligently on subjects that necessarily engage the time and attention of every dentist in full practice. The chapter headings are—temporary teeth, permanent teeth, extraction as a means of preventing decay, irregularities, treatment of adult teeth, amalgam, pivoting, gutta perch for impressions.

A COMPLETE INDEX OF THE DENTAL COSMOS. Compiled by James E. Dexter, M. D. S., at the instance of A. L. Northrup, D. D. S., M. D. S. Vols. I. to XXIV, inclusive. Philadelphia: The S. S. White Dental Manufacturing Co.

This index, the only one of any account to the dental profession as a profession, is now, after a number of more or less vexatious delays, within the reach of every one who can afford the necessary outlay. It is a work that should be in the hands of every dentist in the land, no matter whether his file of the *Dental Cosmos* goes back five volumes, or ten, or the whole twenty-four. If he reads anything he reads the *Dental Cosmos*, and if he reads that he must needs have at hand something that will enable him to find just what he wants to know, and that without unnecessary loss of time. The index almost wholly ignores the titles given articles by their authors, which are often fanciful and senseless, and in their stead gives the subjects mentioned in the article, whether one or many, separately, and in some instances, in half a dozen places and under as many different headings.

The publishers have done a "big thing" for readers of the *Dental Cosmos*, and others, who would know what has been as well as what is, and have done it at an outlay that will necessitate a large sale to fully reimburse them.

As to the compiler, we doubt if there is another man in the dental profession as well equipped for such an undertaking, and as competent to see it through as Dr. James E. Dexter.

DENTAL CARIES. By Henry Sewell, M. R. C. S., L. D. S., Eng. London: Builliére, Tindall and Cox. Pp. 66. A series of papers reprinted from the *Journal of the British Dental Association*. Of some of the work done on this side of the Atlantic, the author says: "Papers have been composed and read, which, except for the show of technical polysyllables and of incoherent phrases indiscriminately snatched from the store of current physiological jargon, have contained nothing remotely resembling science. These papers have been seriously received at societies, and discussed in a corresponding spirit. Floods of incomprehensible rigmarole have thus been poured forth, which could only be compared to the ravings of a party of physiological bedlamites—a tale told by an idiot, full of sound and fury signifying nothing." A vigorous production, and as racy as vigorous.

BEECHER'S MANUAL AND DENTAL DIRECTORY OF THE UNITED STATES, 1884. New York: Beecher & Co. Pp. 163.

